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EQUITY INVESTMENTS, VENTURE CAPITAL, AND THE FEDERAL ROLE IN THE AVAILABILITY OF FINANCING FOR HIGH-TECHNOLOGY COMPANIES

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Equity Investments, Venture Capital...

HEARING

BEFORE THE

SUBCOMMITTEE ON
ECONOMIC GROWTH AND CREDIT FORMATION

OF THE

COMMITTEE ON BANKING, FINANCE AND URBAN AFFAIRS
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

NOVEMBER 16, 1993

Printed for the use of the Committee on Banking, Finance and Urban Affairs

Serial No. 103–99

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EQUITY INVESTMENTS, VENTURE CAPITAL, AND THE FEDERAL ROLE IN THE AVAILABILITY OF FINANCING FOR HIGH-TECHNOLOGY COMPANIES

TUESDAY, NOVEMBER 16, 1993

House of Representatives,
Subcommittee on Economic Growth and
Credit Formation,
Committee on Banking, Finance and Urban Affairs,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:30 a.m., in room 2222, Rayburn House Office Building, Hon. Paul E. Kanjorski [chairman of the subcommittee] presiding.

Present: Chairman Kanjorski.

Chairman Kanjorski. The subcommittee will come to order.

The subcommittee meets today for the third in a series of roundtable hearings on the potential for stimulating economic growth and new job creation in the United States through Federal technology transfer and private sector commercialization. Today we will be looking at the role of venture capital financing and equity investments in the development of new and existing high-technology companies and entrepreneurial activity.

Few analysts will disagree that small businesses and entrepreneurism are at the forefront of U.S. technology commercialization and business development. The 1990's has been cited in several recent publications as being the "decade of the entrepreneur." The administration has initiated several important programs designed to assist and enhance technology transfer. Yet, even with these initiatives, many small businesses will probably need to hire a consultant to sift through the maze of government bureaucracy. In addition, the availability of capital, which is so critical for business development and commercialization, is still frequently an insurmountable obstacle.

We have asked our participants today to help us examine options for making credit more available to facilitate the commercialization of new technologies. In particular, we will be discussing the possible role of the Federal Government in offering venture capital and equity-type financing for business development. For example, does the opportunity for Federal profit-sharing and nonvoting participation in a developing company offer a viable additional financing tool, along with more traditional forms of assistance, such as loans, loan guarantees, and grantsmanship?

Joining us today are representatives from several State, local, and university-led initiatives directed at analyzing and facilitating the financing of high-technology business development. Although Mr. Preston, director for technology development for the Massachusetts Institute of Technology had originally intended to participate in today's hearing, he regrets that pressing business in Cambridge will keep him from attending. Without objection, we will submit his statement for the record.

[The prepared statement of Mr. Preston can be found in the appendix.]

I would like to thank all of our participants this morning for taking time out of their busy schedules to meet with us, and we welcome them to the subcommittee.

Gentlemen, if you will join us.

We have as participants today: Mr. Ronald Maheu, partner, co-chairman, Technology, Venture Capital, and Graduation Strategy Committee, Coopers & Lybrand, Boston, Massachusetts.

We have Mr. E. Lance McCarthy, director, Industrial Development, the St. Louis Economic Conversion Project, St. Louis, Misssouri.

We have the Honorable Joel Lee, deputy secretary, Department of Economic and Employment Development, State of Maryland.

We have Dr. William E. Wetzel, director, Center for Venture Research, University of New Hampshire, Durham, New Hampshire.

Finally, Mr. Thomas Stanton, attorney at law, Washington, DC.

Generally, at these roundtable discussions, we try to get off the beaten path from the prepared statements. As a matter of fact for the record, without objection, all the prepared statements will be made part of the record.

I would ask, as we come across the panel, if you could synthesize comments you made in your statement so we could get down to the byplay. The byplay is your examining and questioning of especially each other which is certainly more helpful than what I could ask in the nature of questions.

Hopefully, we could conclude the hearing getting a real insight as to some of the problems we have and what we can do, and any suggestions of what we can do in the subcommittee or in Congress would certainly be helpful. The object is not for the subcommittee to fill up pages of transcript, quite frankly. It is really to get some information from you. Our policy is to go to the well where the water is. So please furnish it to us and do not be hesitant.

And do not allow somebody to make a statement here that you disagree with and not challenge it, because that would be foolish on all our parts. If you want to take over the hearing at any time, between yourselves, I am happy to sit here and listen, to tell you the truth.

Mr. Maheu.

STATEMENT OF RONALD MAHEU, PARTNER, CO-CHAIRMAN, TECHNOLOGY, VENTURE CAPITAL, AND GRADUATION STRATEGY COMMITTEE, COOPERS & LYBRAND, BOSTON, MA

Mr. Maheu. Thank you, Mr. Chairman, members of the subcommittee. On behalf of Coopers & Lybrand, I appreciate the opportunity to explore with you ways to invigorate our economy. I will discuss the present venture capital initiatives, equity investment options, and the future Federal Government role in the financing of technology companies.

The Federal Government serves a vital role in creating and preserving jobs for its citizens and economic growth in the Nation.

I will offer some ideas on how providing marginal risk capital you can create, preserve, and promote predictable and accessible risk capital that creates jobs and economic value.

As a country, our policies should be directed toward eliminating any disadvantages to our competitiveness in the global marketplace. Capital, the lifeblood of economic competition, is fungible. Therefore, we must provide incentives to generate and perpetuate risk capital availability to our Nation's most promising enterprises.

My summarization presents a method to fuel our economy and provide jobs through independent management of risk capital.

Why not let the independent private venture capitalists compete for government funds, to finance those patents, licenses, and technologies, and bring the resulting economically successful companies to the marketplace?

Congress' role should be to provide a policy umbrella that increases—and a level funding mechanism—that supplements private capital flows for high-technology companies.

Let us not be naive.

Capital will flow wherever it best rewards the investor. But as elected representatives, Congress has the power to change economic, banking, capital formation, tax, treasury, antitrust trade, and social trust policies to ensure the influx of capital that will drive our economy.

There are a number of macro and microeconomic business factors we need to consider. From the macro perspective, as has been discussed in previous panels, and will be discussed today, we compete globally in the capital markets for money flows that are fungible and cross international borders instantly. The result is that capital flows to the investment opportunity that offers the greatest after-tax return for the risk accepted.

And returns, both before- and after-tax, are impacted by government policies versus those of global competitors. Any of our policies that enable attracting funding need to be reinforced or put in place, and any that are inhibitors, need to be eliminated.

My point is that we must focus on creating and competing on a level playing field for capital, risk capital. This requires not only the macro perspective but also the development of tactical policies and plans to create a strategic umbrella that removes competitive disadvantage for American companies and their opportunities.

In order to accomplish this objective, we need to address the existing policies to determine which are outdated and which are enablers that should be supported. In addition, we must create other policies to eliminate competitive disadvantage in a global marketplace.

I submit there is an existing model that is unique and extraordinarily successful. That model is the private venture capital industry in America.

By way of background, venture capital is most successful when there is a balance between the supply of funds and the opportunities to invest in entrepreneurs who are running or anticipating running high-growth, high-risk companies. This balance is critical, because an oversupply of available money to invest results in marginal companies being funded, which lowers overall returns and ultimately lowers the future inflow of available risk to fund the next round of technological companies; that is, capital is fungible and goes where the returns are best.

That is well documented by the history of the venture capital industry in the 1980's. Conversely, too little money available means only a few select opportunities are funded and can result in missing some very good opportunities during periods of tight money.

Therefore, the long-term balance of the supply of capital and demand for investment opportunities in the venture process is critical.

It is well documented that the amount of private monies flowing into venture capital varies significantly from time to time; therefore, the supplemental and leveling role the government can play. And we are discussing today what can provide greater certainty to that amount of money and predictability of those funds over a longer period of time.

By establishing consistent overall availability guidelines, government funds would be used to supplement any shortfall in available private monies. That shortfall could be either in a stage of development or in the total amounts of money in the pool in its entirety.

After determining that a gap exists, the critical question is, then, how do we manage the investment of government funds in filling that gap.

I am suggesting an independent board to evaluate proposals from successful independent venture capital firms. The board will allocate a portion of these gap funds to a number of venture capital firms to manage in their traditional, market-driven, and independent manner.

This vehicle is in place, no additional bureaucracy would be required. The venture capital industry is driven by global economic market forces and, more importantly, has an exceptional proven track record.

Its success would not only create jobs but would continue to grow the value of the initial "gap" monies so that they are available in ever-increasing amounts in later years. To borrow from a parable: We would create a process that teaches the hungry how to farm and not a process that gives them a meal.

The amount of "gap funds" could be allocated in such a way that the larger portion, let's say 80 or 90 percent, would go to the private venture capital community via this independent method. Each fund would compete based on the investment criteria, their track record, their successes, for a portion of that gap funding.

Each fund would then be given the opportunity to realize its traditional returns resulting from the achievement of the investment objectives.

A second and smaller portion of this fund would be applied not only to return the invested capital through successful company and job creation but also to achieve an additional goal of reaching certain social, geographic, or other driven objectives.

An example of this might be the Massachusetts Technology and Development Corp., or perhaps Ben Franklin in your State. In this instance, the State created a vehicle to provide capital for a venture fund independent of the government process and the political process, because it was managed by professional investors.

They were given performance measures not limited to financial returns. They were charged with additional measures that stipulated the investment must be in a certain segment of the market, limited in geography to the Commonwealth, and the investments must also be evaluated for their success in terms of creating jobs within the Commonwealth, that they reached a level of success while legislation was being passed that fosters money to be created side by side with this government money.

There are several key reasons for the success of MTDC. The first is the process of investing is independent.

Second, to perpetuate themselves, the programs must yield a return on invested capital.

Third, a stated objective is to strengthen the Commonwealth's economy by creating incremental jobs and incremental economic value.

I believe these two models, taken together, achieve the objectives you are seeking.

I would like to stress one point further. Upon execution of these suggestions, it becomes essential that the funded companies have the optimal opportunity to husband their cash realized and that our government policies—tax, accounting, or others, SEC or other—be directed to optimizing the utilization of these risk funds once inside the companies.

A current example that would have a debilitating impact is the proposed Financial Accounting Standards Board's opinion on accounting for stock option, because it would reduce equity as an effective tool in the motivation process of high-risk, high-capital investments.

This results in more cash being required to both attract and retain key knowledge workers. This is a greater burden rate on cash long term before product development and positive cash-flows are achieved. The net result? Greater use of cash, more risk of failure, lower predictability of success until well into the mature stage of a company's lifecycle.

This is just one example of how many policy aspects can impact the delicate risk capital equation I have described. Ultimately, the goal of this model is highly desirable. Its success depends on how well we execute national policies that offer this investment vehicle, the greatest possibility for success to perpetuate job creation while commercializing our future and existing technology.

If we keep this process in the private sector, reduce policy-driven inhibitors to investment, utilize independent venture capital vehicles, and remain sensitive to the supply demand issues of risk capital, we will have a dramatic effect on stimulating job creation and our economy.

A recent study done by my firm, VentureOne, and the National Venture Capital Association surveyed over 400 companies—actually surveyed 1,800 companies. We had responses from 1,400 companies, and revealed some surprising findings.

Over 80 percent of the fastest emerging companies depend on outside equity, principally from this vehicle.

Each company received an average of $1.5 million of risk equity and created approximately 140 jobs over this timeframe.

When the equity is available, these companies can generate approximately 50,000 new jobs over a period of time. That is, by saying if the gap that exists in the funding, in the private sector, versus the optimal level, let's say, is half a billion or $1 billion and if we can put $1.5 million, on average, in each of these companies, presuming the opportunity deserves the funding, then we can create, perhaps, somewhere around 6 to 800 new companies. Those new companies, over that period of time, or 4- or 5-year period, would create that level of jobs.

I would submit that now is the time for the Federal Government to take the steps suggested to assist this situation, create new jobs, and refire economic growth across the Nation.

This concludes my overall strategy for financing high-technology companies. I welcome the opportunity during the open roundtable session to discuss this in greater detail.

[The prepared statement of Mr. Maheu and three Coopers & Lybrand brochures can be found in the appendix.]

Chairman KANJORSKI. Thank you very much.

Mr. McCarthy.

STATEMENT OF E. LANCE McCARTHY, DIRECTOR, INDUSTRIAL DEVELOPMENT, THE ST. LOUIS ECONOMIC CONVERSION PROJECT, ST. LOUIS, MO

Mr. MCCARTHY. Mr. Chairman and members of the subcommittee, I would like to extend a warm and sincere thanks for allowing me to speak today.

My name is E. Lance McCarthy, and I am the director of Industrial Policy Development for the St. Louis economic conversion project. We are a private, nonprofit organization with the purpose of assisting military contractors in their effort to convert to the commercial sector.

You all understand fully that it is imperative we provide leadership and technological development as we approach the 21st century. We face huge downsizing in defense, coupled with the rapid growth of the information age.

The global market is increasing, and the more cohesive our national team is with technological developments, the more apt we must assess the best way possible to transform existing patents, not just government, but university and private sector as well, into products to be sold to national and international markets, products that are driven by demand and human need rather than high-tech supply.

Further, we must provide a vehicle for small business to grow and become more efficient because it is the small firms that can change with the technology, that have the flexibility to form joint ventures around the world, and that remain committed to their local community here at home.

I am going to recommend equity investment as a means of public/private partnerships.

My testimony will focus on defense conversion technology, in addition to existing patents and the role of government as it relates to equity investing. Presently, there has been some attempts by government in this issue. This has been in the bill sponsored by the House, H.R. 820, and by the Senate, which is still on the floor, S. 4.

. Although these are reasonable efforts, it is necessary to allow the private sector to perform in its area of expertise and develop a partnership with the government. Thus, my financial research was prompted by three reasons: One, defense conversion is a serious problem; the defense and aerospace business has generated industrial competencies that we want to preserve.

Two, I believe that there are significant financial opportunities in this military sector that would promote new companies, thus providing new jobs. This growth could be realized in the long term and in the short term as well. Contrary to popular opinion, not all defense companies are inefficient producers. These are some of the best and brightest people we have.

Three, the third reason is that I sincerely believe strongly that while the government can assist in the transition of financing new technology and this transition, the government is not the solution alone when it comes to equity investment. The solution comes with public/private debt/equity partnership.

Capital exists within the private sector for these activities at an order of magnitude more than could ever be found in government.

As I have spoken with top investment bankers and economists, there was a general consensus. These professionals are skilled in the ways of the capital markets and the defense industry and have access to the capital. They can translate defense opportunities in a way that is understood by Wall Street.

There are few links between the defense world, the commercial world, and the financial markets and few people who are able to understand these three. On the venture capital side, there is a well-established network of venture capitalists. They receive well thought out, well presented business plans every day—something defense companies and national laboratories are not accustomed to doing.

For the most part, there is a lack of defense industry knowledge among the venture capitalists, and the comfort level is not high. With other industries, such as biotech, the comfort level is high because of decades of investment experience. In addition, the biotechnical financial returns have been historically high, giving little reason for these venture capitalists to risk going into new, complex areas when fortunes are still being made in the old.

There are two groups who would look at these military companies; strategic buyers and financial buyers. The strategic buyers view many of these companies as too small to deal with. With financial buyers, there is a general lack of knowledge of the industry and—outside of their interest in some of the larger defense companies whose stocks have increased dramatically over the past few months as they have sold off parts of the store—they do not perceive the industry sector as a good investment.

This Nation has faced the problem of defense conversion before. Why, then, is the solution so elusive? One reason is the magnitude of the problem. Another is our tendency to focus a disproportionate amount of time seeking salvation from the government, a government which is facing severe limits on the availability of public funds.

The greatest problem, however, is the gap that exists between the defense industry and the corporate world. It is these capital markets which can and should transition to stimulate the defense industry and government-owned technology.

The solutions for financing government-owned technology and defense conversion should come from both the private and public sectors. First, it is important to look at the criteria for successful transition. Basically, you need five ingredients.

One, manufacturing engineering. For adequate funding and profitability, we need a strong manufacturing link among government, the university arena, and the manufacturing markets. We need to give manufacturing and engineering some glamour, recognize that it is just as important as aerospace. And we need to start a campaign to place more emphasis on this area. We lose to foreign competition due to their emphasis on this area and our lack thereof.

Two, integrated technology base-successful conversion. There needs to be an integration of the technology base. Government regulations and controls on defense companies and national laboratories have segregated the commercial military industry and created inefficiencies in both systems. Artificial barriers should be removed to allow for a wide diffusion of technology and accelerate the flow. NIST, ARPA, and the National Center for Manufacturing Sciences are doing good work; but we have a ways to go.

Three, access to capital. Capital exists in the private markets for defense conversion. However, there is a longstanding skepticism of the defense industry—high cost production, cost overruns, inefficiency, and the time to market—by private investors and a general lack of understanding of the advance technology resident within the defense community, much of which has been cloaked in secrecy.

Four, strategic direction. Within the defense and aerospace industry, the landscape has shifted dramatically among the larger companies. The second and third tier companies, the core of our technology base, have been less focused. Many sectors remain fragmented with over capacity. Few creative ideas have emerged on how to restructure or consolidate these smaller companies. And when they have emerged, there has been a lack of understanding of and access to capital markets to assist in carrying out the plans. Again, there is no catalyst or interpreter to assist in this transition process.

Five, communication between divergent corporate cultures. Defense contractors and private industry have widely divergent views. Private industry caters to a large, commercial, consumer oriented marketplace. They typically produce at the lowest possible cost, have high volume production runs, and a short time to market. Quality is extremely important, but a toaster does not need to work for 100 years in a hostile environment.

Defense contractors, on the other hand, have had largely one customer, the Department of Defense. Production runs are often low volume with long leadtimes, adjusted annually by budget changes. The prices are high, not just because of low volume, but also because of the perfect reliability required by military specifications. The corporate cultures do not speak the same language and have trouble communicating. They are in need of an interpreter.

Of all these factors, access to capital is the most important factor, and access is dependent upon bridging the gap between the two cultures.

Problems with current programs. As currently designed, most programs, and the TRP in particular, do not require these criteria for success. Worker training programs are useful but not unless there is a clear vision of what kind of workers will be needed in the future and not unless jobs exist.

Companies which are financially sound, growing, and creating jobs are best suited to design their own training programs. It is also commendable to attempt to fund markets. Still, the government alone cannot determine which companies and projects should receive that financing. Private markets are a resource here.

Another problem with the TRP is that it encourages the mentality which predominates the defense industry, that is look to the government for dollars. The TRP also reinforces the process which the defense industry is accustomed to: Wait for an RFP, make your proposal, then wait for government to make a decision. The commercial world of finance that government patents and defense companies are going to have to learn to operate in does not work that way. Public/private financing is in accord with President Clinton's Reinventing Government proposals.

Government efforts should concentrate on facilitating private sector activities and getting more leverage from public dollars spent.

In fact, one of the greatest shortcomings of both the defense conversion programs at both Federal and State levels is this failure to leverage private investment capital. The TRP does attempt to involve private funds by requiring matching funds.

This, however, makes it difficult for small companies to meet the requirement. The larger, better organized companies can usually not only come up with matching funds, they can find matching funds from other government programs. Some also are driven by the desire to access the only new source of program dollars rather than a long-term commitment to conversion. Both defeat the goal of attracting private sector capital to the TRP and financing existing patents owned by both the government and universities.

In short, the intent of the administration and Congress to assist in the equity financing of technology and defense conversion is correct. However, there are several obstacles to government solutions.

The first is scarcity of public funds. And the second is that government is not accustomed to dealing with commercial market forces. Consequently, I would like to propose alternative approaches which I believe are necessary as we look at government's role in equity financing.

Alternative approaches. Is it really possible to leverage private investment capital? With returns on savings and money market accounts hovering at 2 to 3 percent, there is private capital available for any investment with a high probability of not losing money.

Numerous promising opportunities exist both in startups requiring venture capital and the consolidating and restructuring of existing defense companies and existing government-owned technologies.

The first example, the City-State Initiative, is that type of program that could be implemented in a low-volume venture capital type environment. This could easily be adopted in the Midwest.

Venture capital has five tiers: Preseed, seed, startup, second level, and third level.

This program would incorporate the first three levels which are most difficult to fund and the most difficult to acquire. In this proposal, the State would appropriate $250,000, and the city/county would appropriate another $250,000.

The city's funds could be acquired from the Federal Government. The management would be qualified based on prior fund management experience.

I would also recommend here, and in the other two initiatives below, that the Oversight Committee is a citizen's board that gives access to organized labor, small business, minorities, and women. This is not just the right thing to do; it is the smart thing to do. We would then leverage the government base of $500,000 in the private sector market. Debt/equity leveraging operates at a ratio of 10 to 1 and will generate an operating fund of $5 million in private/public partnerships; the fund will make $100,000—$300,000 investments based on market potential, profitability and social concerns.

This proposal would not only provide financing for new technology, but it would also generate a return that would be paid both to the private sector and to the government. These returns could be reinvested in the second fund.

The next proposal is a regional initiative. It is larger in nature and could be set as a regional model where a more venture capital-intense environment is implanted. The regional fund would take direct investments from government agencies, for example, the TRP. The company would then raise, within the private capital markets, additional funds, say an 8 to 1 basis. This could be done on a pilot project basis; the government would invest—and I stress, "invest," not "loan," nor "grant"—$10 million. And the investment company would raise an additional $80 million.

With the investment fund, the company would provide capital to start companies which utilize defense technology to meet commercial marketplace needs and existing government-owned technologies. It would also purchase all or part of our existing defense companies, providing them with the equity capital needed to diversify, consolidate, and restructure in order to remain profitable, therefore, saving existing jobs. Success is easy to measure—it is the rate of return of investment.

Quarterback Investments could lead such an effort. The president, Jon Kutler, has had the best of both worlds. Having served 6 years in the military, he ventured to Wall Street. As an investment banker, he constructed leverage deals of major defense contractors. Instead of trying to push technology out of a defense company, they look for a commercial need for a technology then use their knowledge of the defense industry to find technology which meets that need. They are the leader in venture capital market as it relates to defense technology and is a model company for this venture.

In addition to equity investments for new technology, I propose that the government provide working capital in the form of grants to these new private/public partnerships. This would allow growth of more new companies, assisting in decreasing crime and unemployment. If such an equity/debt venture fund could be established and duplicated to all parts of the country, you would further the link between the defense industry and the private markets for further investment of existing government technology, university technology, and defense conversion technology.

It is my recommendation this model program be implemented as soon as possible and existing departments of the government should investigate for this initial fund, specifically the EDA or a new form of SBA.

As we move toward a global market, it is mandatory that we focus on areas that could position us as a market leader. Technology in the 20th century led foreign competition to lead in development and economic growth. It is evident that we have existing government patents and leading technology for future growth.

Although technology is the vehicle to economic sustainability and growth, it does not create jobs. It is the infusion of capital that creates jobs. The world is changing right in front of our eyes, and the term "Reinventing Government" is becoming synonymous with change. We must adopt equity investments with public/private partnerships that will take advantage of existing government technology, university patents, and defense conversion developments. It is here where we will find true domestic economic growth as we grow and enter the global economy of the 21st century.

Thank you.

[The prepared statement of Mr. McCarthy can be found in the appendix.]

Chairman KANJORSKI. Thank you very much.

Mr. Lee.

STATEMENT OF JOEL LEE, DEPUTY SECRETARY, DEPARTMENT OF ECONOMIC AND EMPLOYMENT DEVELOPMENT, STATE OF MARYLAND

Mr. LEE. Thank you. If you do not mind, Mr. Chairman, I will take your invitation to simply digest my comments, if I could.

First of all, let me thank the subcommittee for holding these hearings. I think it is a terrific opportunity for you to hear and for us to discuss the kind of issues we perceive in the economic development world and in business formation.

Let me start by talking a little bit about our State and what kind of problems we are facing as we move into the 1990's and into the 21st century.

Maryland had an economy ideally designed for success in the 1980's. We relied on government growth, defense spending, expansion of the service industries, in particular banking and real estate; and we were far too over reliant on construction.

These things are not a surprise to anyone on this panel. I think there are many States that have these sorts of problems. But that formula for success in the 1980's has been a recipe for distress in the 1990's. And we see technology as being the most significant avenue for us and many other States to grow out of this economic mailaise we find ourselves in in the early 1990's.

We have tried to pay careful attention to what our technology business is and what the State of Maryland needs. There are three components to success: Management, good science, and financing.

Significantly for this subcommittee, the third component, in combination with management and good scientific ideas, is capital. And it is an interesting set of issues that are presented for a variety of different firms. We have heard, I think, two very useful points of view.

I want to give you a sense of what we have heard from our technology companies in the State of Maryland. We surveyed them recently with the principal objective of finding out what their major concerns were, what they believed to be their most significant constraints to growth.

What we found in our survey was that the most significant issue for these technology companies was quality of work force—something that is not a topic of today's discussion, but I think bears remembering as we discuss this—that work force quality is the most critical thing for these companies. But the second most important thing was formation of capital.

What we found interesting and what we really expected to hear from these companies is give us venture capital, help us find venture capital firms. Instead we heard something that was quite different, relatively unexpected, and I think bears some discussion here today. And that is that these companies believe that what they needed were traditional debt vehicles, for long- and short-term working capital, for equipment loans, and particularly for revolving lines of credit.

Let me talk about that for just a moment, because I think the principal focus today is to look at venture capital.

We need to develop ways of helping these technology communities as they move from product investment into actual production to find commercial banking institutions that are interested in dealing with them. Commercial banks have great difficulty understanding value and knowledge-based companies. They are capable of dealing with bricks and mortar real estate. They are capable of dealing with equipment and, to a certain extent, dealing with accounts payable and accounts receivable.

With knowledge-based firms, the principal collateral for banks is very difficult for them to assess. There are no appraisers that routinely define the value of intellectual property so that we find a need within the commercial banking institutions to create a new and very different kind of loan committee.

We are working with a number of banks locally, as well as trying to attract banks nationally, who have developed some expertise in this. The Silicon Valley Bank comes to mind as an institution that has developed some expertise in evaluating intellectual property.

So we hope one of the focuses of your subcommittee is to begin to look at how to encourage commercial banks to diversify the kind of products they offer and begin looking at the sort of opportunities that are created by providing debt funding to technology firms.

I want to talk with you now a little bit about what we have done in the State of Maryland to encourage the formation of capital and, by doing so, give you a sense of what we found as a particular shortcoming of venture capital within the State of Maryland.

Our longest standing effort has been something called the Maryland Venture Capital Trust in which we encouraged the legislature to invest $2 million and then went and sold that $2 million investment to public pension funds, raising, ultimately, $19 million. That $19 million became a fund of funds, essentially, where we invested in venture capital firms who would make an agreement to give Maryland first preference in their equity investments and venture capital.

Thus far we have identified virtually all of the venture capital firms with which we will invest. The total capital we leveraged about $60 million total leverage.

What we were trying to do there is, essentially, not make capital available to companies for which it would not otherwise be available but to address a very specific problem that we found in the State of Maryland. Maryland forms venture capital very nicely, thank you. We have lots of people who put their money into venture capital corporations.

What we found is their investments didn't often land in Maryland. They landed in other parts of the country. So our effort here is essentially to make Maryland a better target for venture capital. We didn't change the nature of how venture capital formed but rather how it was targeted. So our Maryland Venture Capital Trust addresses that problem.

In conjunction with the University of Maryland and their extensive capabilities, we have created the Maryland Industrial Partnership, MIPs for short. MIPs has, as its focus, trying to create an environment of entrepreneurship.

There are a number of companies, both small and midsized companies, who develop, as a byproduct of their production activity, useful, interesting ideas. They do not wish to sell this idea. They do not wish to create a new kind of corporation.

We try to find incentives for those business people who owned those ideas within to try to develop them. So MIPs was created. MIPs is, very simply, a subsidization of research that allows for product development within firms, an interesting, and, I think, useful approach.

Product development is the most significant problem we have with venture capital. As our companies mature, when they have a definable product that somebody can look at and say, yes, I like this, their ability to attract venture capital is reasonably good. We have not found problems with those kind of firms.

What we have found is, over time, there has been a retrenchment of the venture capital community who originally rushed in to develop new products but receded from the market when results were disappointing in fields like biotechnology—because biotechnology is such an emerging component of our technology base, we need to get our companies back into that product investment phase.

We have done a couple of things that are really very modest. We created the Challenge Investment Grant in which we will put up to $50,000 into any small company to advance to the next stage of their product investment, a fairly modest effort that has met with terrific demand. I think one of the things the subcommittee should understand here is there is extraordinary demand for this kind of financing out there.

The techniques and tactics to get that money available are, I think, a subject of a number of the other panel members' discussions; so I won't go into that.

But I think one point to draw out of Mr. McCarthy's discussion is about the Technology Reinvestment Program through ARPA. While it has flaws and it essentially represents sort of old style gizmos of providing big Federal money in order to create new, big opportunities within research, there is something to underline here; and that is that for half a billion dollars of available money, the Federal Government got $8 billion in program requests, about 16 to 1 availability. There is a huge demand out there for that money. So in sizing the kind of response the Federal Government should make, it should be clearly understood that $16 billion is probably the tip of a much larger iceberg.

We have, in putting this whole alphabet soup of programs together, used, I think effectively, what exists now at the Federal level to stimulate product development: Small business, innovation research grants, a significant generator of research activity, and product development activity in the State of Maryland.

We encourage the subcommittee to look at, understand, and underline the importance of that Small Business Investment Program.

CRADAs, with Federal agencies, are especially important in the State of Maryland. We have 60 laboratories in the State who generate too little real business product. We need to see those CRADAs with those Federal installations. We need to see them with their envelopes stretched. Senate bill 4 was an interesting and very useful step in moving CRADAs to the next level and injecting commercial interests and business interests into those Federal laboratories.

New on the scene are changes in small business investment company rules. We see those as particularly significant and hope to make government investments in those. We hope to invest directly and would like to have a management role in investing directly in small business investment companies.

We believe that if we are going to put our money on the table as a State government in investing in those corporations, we really ought to have some say in managing them. We understand there are substantial legal impediments to doing that. We believe we will want to work those out and would encourage the Federal Government to look for solutions there as well.

Our final initiative is one that we have begun working on in a much more significant way. Building really off of the investments, the small leveraged investments that we have tried to do, we are creating an enterprise fund which is designed, with the approval of our legislature, to make equity investments, something we have not been able to do. We are now able to take equity investments in companies with limitation on the percent ownership we can have through that enterprise fund. And with limitations on the length of time we may hold that ownership.

We will manage that process by creating a private sector board who will evaluate our investments. We expect that private sector board to then be supplemented by a great many knowledge-specific loan committees and investment committees that are essentially derived from the existing business community as well as the university community.

Mr. Chairman, that concludes my summary of my testimony.

Thank you.

[The prepared statement of Mr. Joel Lee can be found in the appendix.]

Chairman KANJORSKI. Thank you very much, Mr. Lee.

Mr. Wetzel.

STATEMENT OF WILLIAM E. WETZEL, DIRECTOR, CENTER FOR VENTURE RESEARCH, UNIVERSITY OF NEW HAMPSHIRE, DURHAM, NH

Mr. WETZEL. Good morning, sir. My name is Bill Wetzel. I am director of the Center for Venture Research, at the University of New Hampshire. We have been plowing around in this field for about 15 years now.

My remarks are going to depart substantially from some of the recommendations and testimony you have heard earlier in the course of the last three hearings. I have prepared written testimony; and, consequently, what I am going to try and do, at your suggestion, is hit only some of the highlights and do it in rather conversational form.

Before, however, I think that the subcommittee can—and public policy in general—can deal effectively with ways of stimulating the entrepreneurial segment of the economy, technology based in particular, is to dispel what I perceive to be some serious misconceptions about where the jobs are coming from in our economy. I have six of them I am going to refer to very briefly. I will follow those with three suggestions of what I think would be appropriate approaches to developing public policy to promote entrepreneurial technology based enterprises.

I want to preface my remarks, however, by calling attention to the fact that I think 1979 represented really a transcendental milestone in the U.S. economy. Employment. Fortune 500 peaked at 16 million employees. It is now down to 12, a drop of about 25 percent.

In the last 14 years, the invisible entrepreneurial segment of the economy has generated about 20 million jobs. I would suggest to you that is not just a temporary phenomenon. That is an underlying structural change I think is important when it comes to dealing with developing public policy for this country. It is referred to in some conversational terms as the atomization of America.

Before we can really move to ways of talking about supporting this new entrepreneurial economy, the misconceptions I would like to call to your attention are really six. The first is the notion that small business is the job-generating engine of the economy.

I submit to you that over 75 percent of new jobs are being created by only about 8 percent of small businesses. These job-generating businesses are started and driven by entrepreneurs, not by the traditional small business men and women. I think that distinction is absolutely critical for any discussion of financing technology-based enterprises, because size is not the distinguishing characteristic.

Innovation, change, risk taking, growth: Those are what distinguish that 8 percent from the remaining 90 percent. I won't go into the numbers of those ventures that fall into that entrepreneurial category, but they are significant: 50,000 startups and probably 500,000 existing ventures.

Number two, access to credit is the major financial obstacle to job creation. That is a serious misconception, and it results from misconception number one, because what entrepreneurs need is access to equity capital. That is the obstacle, I believe, to the development of a powerful technology-based entrepreneurial segment to our economy. It is particularly acute for early stage ventures that could in no way qualify for bank credit. They depend on skilled employees. They do not have any tangible assets to speak of. That is point number one with respect to the need for equity.

Point number two deals with the point mentioned earlier having to do with existing high-growth companies. It was mentioned they need credit. I submit to you if a company is growing faster than 20 or 30 percent per year, they need a solid equity base before they can qualify for the debt capital that can then be built on top of that. Without that equity base, you are going to get a very lopsided balance sheet very quickly. So equity capital is important not only for startups but for existing companies.

The next misconception I would like to deal with is that venture capital, high risk, early stage, value-added patient money comes from the companies, the venture funds that are listed in Pratt's Guide to Venture Capital Sources.

That misconception results from the fact that there are two segments to the venture capital market, one visible and one invisible. The visible market is the one that has been referred to the 500 funds that manage something like 35 billion dollars' worth of capital. That is about the size of one medium-sized bank, the Bank of Boston, for example.

In the grand scheme of things, that is not a lot of money. Those funds invest about $2 billion every year and every day on the floor of the stock exchange, more than $2 billion changes hands. We are talking really not in grandiose, unachievable terms here.

The invisible market, which is the one I want to address, is made up of 2 million self-made, high net worth individuals, often referred to as "business angels." In the 1970's and 1980's, this transition from the benchmark of 1979 spawned a huge choir of technology based angels. And I submit to you their know-how street smarts, and capital are two of this country's under-used resources.

That is one of the primary thrusts of my message today. The best estimates one can come up with of the scale of this informal market is there are 250,000 of these angels that invest somewhere between $10 and $20 billion a year in entrepreneurial ventures.

They have a much higher propensity to invest smaller amounts of money in the early stage in the life of a company, $150,000 at the seed or startup stage. What they are doing is investing in the farm system that spawns the next generation of Apple, General Electric, whatever. These companies didn't spring up on the face of the Earth full blown. They were started by entrepreneurs in garages. Ken Olson is a good example of that.

So that is my second and most powerful point, really, is that this venture market is a two-segment market, one visible, one invisible. The invisible one is many orders of magnitude larger than the formal venture capital market.

I submit to you too, sir, that the angel market and the institutional market are not competitive markets. They do not compete for the same kinds of deals. The angels, what you might call the farmers, that spawn the new ventures, the venture funds are the hunters, that are picking off the home runs. You are not going to get those unless you start from the bottom and build a grassroots base of companies that, if they do hit something big, are then going to need the second, third, fourth round of venture capital money.

Misconception number four is that all venture capital investments are equally venturesome. They are not. The risks involved in bankrolling early-stage ventures are many orders of magnitude greater than the risks inherent in later stage investing. I have some data here in my written testimony that in the interests of time I will skip over.

Misconception number five is that limited access to credit is the most serious financial obstacle confronting high-growth established firms, private companies that are not going to be public companies within the next 5 or 10 years but are really the backbone of our technological economy.

If those companies are growing faster than 20 percent per year, what they have to rely on for equity financing is retained earnings and internal cash-flow. The faster those companies grow, the more serious the problem they have on raising that cash-flow and building that equity base.

So we have two kinds of companies that we are concerned with that are the technology-based companies, the startups, and high-growth companies.

Misconception number six I will skip over very quickly. Capital gains taxes are a tax on the wealthy. I submit to you that is a fallacy, that they are a tax on the creation of wealth, not on the wealthy, a tax on creative risk taking, the creation of jobs, innovation, and new technology-based companies.

So those are my six misconceptions. They are all documented in my written testimony. I would like to move now to the three public policy recommendations that I would urge you to consider seriously. They depart, as I said, dramatically from previous proposals that have been made.

The basic background point of my recommendations are that, as has been suggested, the allocation of scarce financial resources requires efficient capital markets. An efficient capital market is made up of fully informed buyers and sellers of capital and minimum transaction costs. The market for angel financing is an inefficient market; we have not fully informed buyers and sellers of capital.

They are scattered all over the United States. They are not concentrated in Boston or Silicon Valley or New York City. So they are inefficient markets. And here I am going to make another underlined statement. In my judgment—and this is contrary to other testimony that you have heard—there is more than enough know-how and capital in the heads and pocketbooks of our self-made high net worth individuals to meet the equity financing needs of technology-based entrepreneurs. The problem, however, the challenge that we face, is that this is an inefficient market, and they cannot find each other. And the transaction costs in consummating a deal are enormous.

So I recommend—I suggest to you that this challenge has four dimensions, if what I say is true, that there is more than enough equity and know-how street smarts. And for first-time entrepreneurs, street smarts can do more than capital can. The challenges I think we face are as follows: Number one, we need a far more significant and greater understanding of the attitudes, the behavior, and the characteristics of these business angels, this vast army or choir, if you prefer, that has been generated of self-made, high net worth individuals.

Challenge number two is to provide angels and potential angels with convenient access to relevant information on opportunities to invest in technology-based ventures. These things, as I said before, start in garages, as everybody knows. And these investors are local investors, and they are tuned into local networks.

Challenge number three is to provide these entrepreneurs and angels with convenient access to the know-how required to intelligently price and structure a venture investment. That is what is often referred to as the central mystery of venture capital. It is not buying 100 shares of IBM.

Four, alert potential angels to the opportunities to prudently invest a fraction of their net worth and their know-how in entrepreneurial ventures.

I would like to see us turn more angels into street walkers. I do not mean that to be a sexist remark in any sense of the word. This is my opinion, sir. The Federal Government can earn far and away the biggest return on its policy investment by undertaking initiatives that significantly enhance the efficiency of the private venture capital markets.

I have three recommendations. Two I am going to skip over quickly in the interests of time.

Number one is to revive the early stage seed capital provision that was in the Enterprise Capital Formation Act, S. 368, introduced by Senator Bumpers last year. That was wiped out eventually and, as you know, the 50-percent reduction piece of it was retained, which was the venture capital reduction. I would urge you to revise that.

I want to spend the bulk of the time I have left here on my recommendation number two, to provide the seed capital, a government investment, not direct investment, but investment required to create a more efficient market for private venture financing, that the government play a catalytic or facilitating role and not investment directly but unlock the know-how and the capital of these armies of angels, and that one of the goals of this Federal investment ought to be that, after 3 years, this process ought to be a financially self-sufficient one, with sponsorship by the American Expresses, the AT&Ts, the Coopers & Lybrands, the Aetnas, the Merrill Lynches. I believe this can happen.

Number one recommendation is to fund a nationwide study that is substantial enough to form a statistically valid conclusion or set of conclusions, about the attitudes, the behavior, and the characteristics of angels and the scale of that market. It is an invisible market despite its enormous size. The better we can understand it, the better we can fix it.

Number two, for the next 3 years, underwrite the operating expenses of existing venture capital networks that make a market for angel financing.

The technology capital network at MIT is probably—not probably—absolutely is the leading example of this kind of a network. These are not-for-profit organizations. As I said, they are in the business of making a market for angel financing. But they are starved for capital. They need seed capital. They are all not-for-profit. They do charge modest fees, but it is not material enough to promote their services and to implement up-to-date information management technology.

And this recommendation, sir, is consistent with the Vice President's vision of a national information highway, and with the Clinton administration's approach to an activist policy toward commercializing technology.

Recommendation number three is to provide the seed capital to fund MIT's plans to create a national technology capital network. I won't go into the details of this. It is in the conceptual stage. But it would be a regionally based one with substantial interlinkages that would involve partnerships between the country's leading Federal laboratories and research-based universities. The spawning ground of new technologies.

Number four in this set of recommendations for improving the efficiency of the angel market is to underwrite the cost of developing the educational materials that will raise both entrepreneurs' and angels' competence and confidence in their ability to price and structure an investment, the central mystery of venture capital. This is designed to reduce the transactions costs of venture investing.

Five, for the next 3 years—and I put a time limit on this—underwrite the venture capital network's marketing costs to alert potential angels to entrepreneurial investment opportunities and to the prudence of investing their know-how and a fraction of their net worth in promising ventures.

I am going to underline verbally a statement I have in my written comments that increasing the number of active angels from 250,000 to 1 million, which is about half of the 2 million self-made millionaires in this country, should be a major policy objective of this administration, and will help us really deal actively with our true capital formation challenge.

The cost benefits are enormously favorable to the government. For a cost of $25 to $50 million—and this is right off the top of my head—I truly believe you could unlock somewhere on the order of $10 to $20 billion of private equity capital if we could effectively make this market work more efficiently.

My third and final recommendation deals with the equity financing needs of high growth, existing companies. And here I am going to recommend something that was introduced by our former Representative, Judd Gregg, now Senator, something called a Growth Tax Credit, that was eliminated in committee about 5 years ago, that would provide an income tax credit based on the annual rate of growth in sales over the previous year.

And I have documented in my written testimony six, I think, key characteristics of that Growth Tax Credit. The primary one is that it would make a powerful statement about the Federal Government's policy affecting our most dynamic small firms. There are a number of others.

So in conclusion, I would just like to thank you for the opportunity to meet with you. And if there is anything I can do to help you develop an effective public policy that really deals with this invisible segment and what I think is a powerful segment, to develop a grassroots approach to developing technology-based enterprises, I would be happy to do so.

Thank you.

[The prepared statement of Mr. Wetzel can be found in the appendix.]

Chairman KANJORSKI. Thank you very much.

Mr. Stanton.

STATEMENT OF THOMAS H. STANTON, ATTORNEY AT LAW, WASHINGTON, DC

Mr. STANTON. Mr. Chairman, I am batting cleanup; and given the hour, I think I will talk very quickly, summarize my remarks so we can have some of the dialog that you have been talking about.

I like to look at the law the way an architect looks at a structural framework. The legislation this subcommittee is considering today, the Federal Technology Commercialization and Credit Enhancement Act—and I have here the October 22 version—creates a structural framework.

And where the earlier people testifying have talked about the needs, I would like to offer to try to build a bridge from the other end: How do we shape the governmental institution to best meet some of those needs?

I teach a course on the law of public institutions at Johns Hopkins and specialize in looking at various forms of governmental institutions to serve various public purposes.

I would like to comment on the draft legislation, and I appreciate the opportunity to do so at an early stage.

Basically, the draft legislation creates a corporation—a technology commercialization corporation that will have 60 percent nonvoting Federal equity, 40 percent private equity, and private management. The corporation will be free from all the civil service limits, pay caps, all of the rules that the Federal Government may be burdened with, will be the sole agent of the Federal Government to commercialize processes, licenses, and technologies that are wholly or partly in Federal Government hands. It will be authorized to tap a Treasury fund and use appropriated funds in order to finance some of the commercialization efforts.

In turn, it could make either debt—long-term loans to companies doing commercialization or actually purchase equity.

I would like to make a couple of comments here, because I respectfully suggest, I would propose some reshaping of that institution. The first problem occurs—and you are more familiar with this than any of us here. It is analogous to the Federal Asset Disposition Association, in some ways. It is also different. I highlight that in my written testimony.

But basically with FADA we were trying to get around a cumbersome Federal bureaucracy and hire people to dispose of Federal assets, a very similar function with respect to failed thrifts. Basically, what we saw was that where FADA, this sort of well-paid, privately managed company, compete and deal with a Federal bureaucracy that was somewhat jealous, the less well-compensated people at the FSLIC, you had tremendous friction involved.

Also, like FADA—and even though this company will have a private management, it is not a private company the way the companies are here that we are talking about, that can do what it wants because it is a creature of the Congress. In fact, the Congress is going to be looking very carefully at it.

And, in fact, it is not going to have the flexibility to take risks, make mistakes, and do things in the disposition of those Federal assets without tremendous scrutiny, public scrutiny, and potential embarrassment.

That said, my personal suggestion is that, one, go in a different direction and create an actual government corporation. These are government assets, government licenses and technologies we are talking about. This subcommittee knows of Ginnie Mae, which is a very well run government corporation. The Export-Import Bank, the Overseas Private Investment Corporation, are other examples.

The virtue of a government corporation over the usual government agency is that you have a lot of the features that are now being talked about in reinventing government. You have flexibility. You can write out a lot of the cumbersome civil service limitations, some of the cumbersome financing limitations, and make this thing much more businesslike than the average government agency, which just cannot do that.

The second issue, and very important, revolves around that Federal 60 percent nonvoting equity stake. In 1967 there was a Presidential Commission called the President's Commission on Budget Concepts. That Commission ruled that where the Federal Government owns any stake, virtually, where the entity is not completely privately owned, that entity must go entirely on the Federal budget.

What the President's Commission on Budget Concepts means for the proposed legislation here is that, even though it is a 60 percent nonvoting Federal stake, it is very likely it will go on budget, with all the negatives, again, that are associated with that.

Therefore, I suggest let's cut through that and create a Ginnie Mae-type structure and recognize—sir?

Chairman KANJORSKI. So you understand the concept, the concept is that 60 percent equity is a given equity without contribution. The purpose is to ensure that the Federal Government will—if success is had in a competitive venture, and since the product invention was paid by Federal taxpayers' money, that Federal taxpayers will receive back that equitable growth in proportion to the success of the company.

Mr. STANTON. I understand.

Chairman KANJORSKI. The government is not to invest in the company at all.

Mr. STANTON. But the form of the government investment, in fact, will be all of those licenses and so forth.

Chairman KANJORSKI. No. It is the exclusive, sole agency. It is the only way you can invest in the agency and ensure that government will participate in the success of the venture.

Mr. STANTON. I guess my suggestion is—in the end, the Office of Management and Budget is going to make this decision; and if, in fact, there is no Federal contribution, and, in fact, you design it very carefully, you may be able to get around the Commission on Budget Concepts.

I would suggest that, in fact, in the structure of the fees for licensing, since that is the sole purpose of this corporation, you could get the same up-side benefit in case OMB rules that this is going on budget because of the Federal stake.

Chairman KANJORSKI. If I can, see—I am defending a concept which I do not identify with closely, so you know that—the effort is to put the reward in the private hands; that is, success is only had by the private investment if they are successful. It is to take away the payment that would tap equity up front.

In other words, when you license a technology, you do not want to tap the entrepreneur's capital for that. So it gives the corporation the total flexibility of negotiating the deal based on a capital contribution from the company, as a portion of the equity of the company.

If we have a great invention to cure AIDS, we wanted you to run with it and put all your capital and marketing in that, in putting it out there in the marketplace; but on the other hand, if the government has spent a great deal of research money, they would like to share in the run of that. But we do not want to inhibit or limit the capital that the private sector would use.

And the intentions would be, I would hope, of the framers, that this is a private company that, just by chance, the U.S. Government gets 60 percent return of the profits on. But it has no direction.

So from FADA, which is somewhat quite different from that, it was a totally owned government corporation, from the standpoint that the only profits to be derived were from the perks and the salaries and the goodies that could be taken out.

So the incentive was not for the individuals that ran the company to have the company be very financially successful, because they would gain no benefit from it. So here is the charge of saying, go ahead and run with this, here is all our technology, you are the sole agent; if you turn it into a multibillion dollar profit, we in the government, the taxpayers, get 60 percent back but you get a 40 percent of whatever that profit is.

Mr. STANTON. I am not arguing with that concept of the government getting an up-side return. I am just suggesting, I do not want to get into the arcane details of the 1967 Commission on Budget Concepts that, where the government has a stake—and, of course, there is this fund that will be attached to the corporation, where the government has a stake in the upside and can take losses on the downside. It is very similar to the way CBO came around with REFCorp and FICO with the savings and loan bailout, that they will say, this is a wholly owned government corporation.

Here I think people will be focusing more on what is the real ownership stake, and is that 60 percent real for the Federal Government.

It is a murky area, as I say in my testimony; but I suspect there are those who would say this is on budget. So I think it is something that has to be dealt with.

Let me go to the second point, though, which is the second step, which is the use of federally provided funds to purchase equity stakes in private companies.

First of all, again, one has this issue of—and here it is even more murky than the first one—do you suddenly have to put all of this stuff on budget because of a Federal ownership stake?

The more serious problem, I suspect, is the competitive one. The Federal Government right now does not own equity in a lot of companies. One of the few it does is the College Construction Loan Insurance Association. What happened is that—and it may have been perception by private competitors—but when you have much larger companies, General Electric Corp., that are in a similar market with one of their subsidiaries with Connie Lee, there is tremendous antagonism to the fact that the government is giving money, investing in, owning part of one of their competitors. And the government is only a partial owner of Connie Lee.

And so once again, what you face—and it may turn out to be political in terms of the process—is that you will have aggrieved nonrecipients of that Federal ownership stake or, worse, aggrieved people who said, you just funded my competitor, who will be going back to the Congress and saying, let's take a close look; and then you get the kind of scrutiny and micromanagement that impedes the traditional government institution that the private institution is free of.

So all I am saying is that you may not have the kind of private sector freedom that you are intending when you design it, even though you build in a private board of directors.

So again, I come back and say, one can cut through that with a straight government corporation; but my job here is just to give you alternatives.

Chairman KANJORSKI. What is the incentive for a government corporation to act successfully?

We have sellers of government technology out here in Virginia, for instance, you have the National Technology Information Service [NTIS]. They successfully have sold 314 technologies in the last 4 years and gained a grand total of $36 million for the U.S. Government. That is 50 percent of all the technology the U.S. Government has funded in the last 4 years—or sold off in the last 4 years. That represents 90 percent of the revenues received by the U.S. Government.

In that 4-year period, the U.S. Government spent $280 billion in research and development; what a poor return.

Mr. STANTON. I cannot talk to the details of that. That is simply not my knowledge base. I can talk about institutional structures.

But, in fact, we do have very efficient government corporations ranging from the Tennessee Valley Authority to Ginnie Mae, which I mentioned, Eximbank. There are a variety of them that, in fact, perform very well. The new Uranium Enrichment Corporation has been set up using this kind of a structure. All I am saying is one can do it that way. And I am simply raising a couple of issues I think have got to be scoped out.

Let me now change a little bit, since my knowledge is more about institutions; but I want to reflect back on what I have been hearing on this table.

What I have been hearing is, again, to use Dr. Wetzel's marvelous phrase, the government's primary role may not be, particularly in this age of not much money in the Federal Government to spend on anything new, the government's primary role may be more as a catalyst, to reduce inefficiencies in the market.

When I heard Mr. McCarthy talk, what I heard was an information gap concerning defense companies—we think they are big, cumbersome, and inefficient. What may be one role for government—and, again, a government corporation can give you an institutional presence the way TVA does a whole bunch of things other than power, because of their long-term focus on an issue, maybe what is needed here is some form of financial rating, of somebody who goes in and rates—the way Standard & Poor's does for the big companies that have the money to spend on that kind of thing, but to bring those efficiencies of new information technologies, financial information, down to the level of the individual companies.

And with that point, I would just as soon throw it open to the group.

[The prepared statement of Mr. Stanton can be found in the appendix.]

Chairman KANJORSKI. Let me throw in one of the major segments in here that we have not addressed, the American Technology Television Network. It is a marketing tool to finally open up what we have to all the entrepreneurs in the country, all of the existing small- and medium-sized businesses. And in the process of determining what technologies you are going to spend your time on—I have looked at two models. I looked at Discovery, and I have looked at NASA, which has a channel. I do not know which one you watch.

Have you ever seen the NASA channel? I do not watch it. But I do watch Discovery. It takes the concepts, reduces them to very easily understandable levels that trigger your imagination.

With a PC you would just have to tap into the computer to find gradations of what this technology is about. But the filtering process would be limited by virtue of time from 2,000 to 6,000 technologies a year. So you are dealing with tens of thousands. You have to select out of those only 2,000 to 6,000 to advertise. But by making them attractive and readily accessible, identifying when they will be on, insomniacs like myself, instead of watching C–SPAN, can watch this network, and can say, gee, here is something I can use in my business to expand, or there is a technology I would like to try out.

So mass marketing through the use of television as an educational tool, really, I think, for the first time, is what we are trying to attempt.

Next we would need a one-stop shopping operation whose incentive is to get it sold, get it out there, without a lot of customization. Presently, you need a Philadelphia lawyer and a Beltway consultant to get through the maze. We want to get you a chance to come in and, in 60 or 90 days, walk out with a product with as little expense up front so you can use that capital in what you are really doing. And, finally, we need to talk about the data base.

I want to compliment Dr. Wetzel. I think you have an excellent idea for creating a library of good ideas that will link entrepreneurs and angels and, easily, the corporation can do that through the technical investment element of it. There is absolutely no reason in this country—and I know so many entrepreneurs that are looking for this support, why so many wealthy people that cannot team up with the right idea. There is no question that we have a great market for that. And I think this is an entity that I hope can go that step further.

For instance, why shouldn't people be able to get on a national television network and advertise, I have capital available, I am looking for engine ideas, I have a team of people who want to invest $100 million in energy ideas.

And why cannot we have a segment where entrepreneurs can come in and say, I have just invented the greatest mousetrap ever made, come see me.

Mr. WETZEL. I think NIST could play a valuable role in part of the due diligence in investors' evaluation of that technology.

Chairman KANJORSKI. The reason I am trying to take government out of this, Mr. Stanton, is, I am only in office 9 years; but I will tell you, my impression is that we do not attract entrepreneurs, innovators, and risk takers in government. Sometimes they can walk into the greatest thing invented and miss the point, because we are really supporters of the status quo, the tried and true; and there is a great disincentive in government to take risk.

Mr. STANTON. I guess I am not disagreeing with you. And in my testimony I tried to point out a number of shortcomings even of government corporations.

I guess my contention is that when you have got Federal licenses and technologies, when you are using appropriated funds that will be taken out of a fund in the Treasury Department, those are governmental functions; that is, government, government's already there.

What I am suggesting is we need some clean lines between government and the private sector.

Chairman KANJORSKI. Are we not doing that with the Small Business Investment Corporation?

Mr. STANTON. SBIC may be a better example in terms of the way to cross that line in a clean fashion.

Chairman KANJORSKI. In a way it goes to something that Mr. Maheu talked about. We are trying to find a way to have an open door window, to use the private sector and the intelligence of, I think, one of the greatest tools in America's success: Investment banking.

If we have ever excelled at anything it is investment banking. We have done it better than the rest of the world. If we can tap into investment banking and only use government as a tool to help do a better job to disseminate the information and create a market, an information market, people can get together and talk.

But then find that driving tool, the final decision on the investment is made not by government. We look to several models, from the Small Business Administration, for instance, Mr. Lee's suggestion. I am very familiar with the Franklin Project in Pennsylvania. The problem with it is that it ends up, to some extent, being academic welfare. You have to tie it in with someone in your project area. Very often the academics are the ones that make a decision. Academics rarely make good investment capitalists.

Mr. MAHEU. Mr. Chairman, I would like to jump in and give my thoughts. Bill and I have been on this campaign for a long time, and we have eaten a lot of rubber chicken together. Anything we can do to make the angel network more efficient, I absolutely agree. However, I would like to build on that. I do not think that by itself is the answer.

I think that is part of the answer. It is a collage here. We need to get the right blending of——

Chairman KANJORSKI. I have to take a break for a vote. But you threw something out that I thought I heard, but I am not sure. Conceptually, I think you are saying, that we should have an open window in venture capital funding. And now I am not sure where that would come from or what we could do, but I like that the concept for venture capital organizations.

Mr. MAHEU. Not only the bad times, but we also have to look at the segments.

Dr. Wetzel appropriately focused on the early stage, and the vicissitudes there have been greatest. And so we need to—if we use the venture capital model—we need to select those venture funds whose investment criteria tend to migrate toward the stage of capital at that time that is hurting.

Chairman KANJORSKI. And that is the capital—the real venture capital I am talking about. I think the marketplace in Wall Street will take care of the second, third, and fourth.

Once you hit success, you have got a pro forma you can hand in and say, this is where we are going. That is easy. It is the fellow in the garage that has the great idea.

Mr. MAHEU. I would like to expand on your thought, and the thought that hasn't been stressed here, that the world's greatest technology with the poor management team will have a lifecycle equal to that technology. That is not what we are about here today.

And the process, the due diligence process, the sorting through and filtering and the getting at the quality of the management team who will make—take that technology and make something with it, is critical to the success of these types of programs so that the money is efficient and continues to grow and roll and leverage and roll around and circle in that process.

I would just say that a class A management team with class A abilities to adapt, who are moving into a dynamic marketplace, is equally as important in my opinion, more important than just the quality of technology.

Chairman KANJORSKI. Absolutely.

We will take a few minutes to vote. I will be right back.

Hold your thoughts, and discuss them among yourselves.

[Recess.]

Chairman KANJORSKI. To get a perspective of where we are going, let me say that in the process we put together with this bill, both with the administration and with the leadership, there is some differences of opinion as to whether or not there is a Federal role to be played in creating venture capital. I really do not even like to pose that question to suggest that there is not. But there are those in the government who feel that this is not a need and that this is not a problem in our society and, therefore, the government should not be playing a role in it.

Maybe a one-statement opinion on this for the record would be important from a panel such as this.

I will pose the question as best I can. In fact, is there a role for government to play now to create venture capital?

And if you could just address that, and then we will get into the issue of what the structure should be, if we can, or why it should not be.

Mr. MAHEU. My personal view is, if we look at the investing history of monies committed to private venture capital flow since, let's say, 1980. This will include varying amounts of monies by year with as low as $800 million committed in the low year to as high as $400 million in the high year. But on top of that, the distribution by type of company that is being financed also varies within those amounts.

So if you had early stage and first round companies, let's say, that were getting 25 percent of the pie, in the $4 billion year; that is, there is $1 billion available that year, but if they were only getting 10 percent in the billion dollar year, there is only $100 million available that year. That $900 million of incremental money is not funding these early stage companies.

That is where the concept came out of presenting a vehicle that could provide for a more predictable and reliable source of monies to these particular levels.

And as the private monies came up because the returns were improving, then the role should be downplayed.

Chairman KANJORSKI. So your answer would be, there is a role but with this idea of an open window for taking the curve and flattening it?

Mr. MAHEU. Balancing the supply-demand equation in the marketplace.

Mr. MCCARTHY. In my testimony, I presented a proposal that showed how government could leverage financing to the private sector. The private sector does not understand that technology.

We all know individuals who are great scientists but cannot get access to government capital. This provides incentive.

Yes, government must play a role in the venture capital arena.

Mr. LEE. To echo what has been said before, I think, absolutely. If I can identify what I believe to be two problems that have existed in the venture capital community, one relates to the predictability that Mr. Maheu talked about before, that we see a huge influx of venture capital, followed by retrenchment.

Smoothing that curve could be useful. And I think the Federal Government could play a role there.

Second is penetration to the earliest stages of venture capital need. There is variability in the market that I think government, as a unique investor, can play. The government can take its return in several different ways. One is a simple straight cash return in its participation as an equity holder. Second, it participates in a series of returns called tax that other investors may not be able to participate in.

So those two things would suggest that the government could have an interesting and somewhat leading role in forcing greater penetration of venture capital to less mature firms.

Mr. WETZEL. Three sort of philosophical points. I do not believe the Federal Government, certainly not the State governments, could begin to match the potential scale of the private marketplaces, and the scale of capital that is needed goes well beyond what the public sector could provide.

But equally importantly, I do not think a direct public investment, Federal or State, could come up with the kind of know-how that is required to intelligently evaluate.

And you have got to do more than evaluate. You have to hold the hands of these ventures through their perilous early years until they get through that keyhole of survival and can come out the other end on their own as viable enterprises.

That leads me to the second point, one I have already made. Given the scale of these markets, and at least with respect to the angel market, its relative inefficiency, I think with the Federal Government's budget being what it is, you could get far more mileage out of helping to enhance the efficiency of that market in terms of a cost/benefit ROI, to use the jargon. And this is, again, philosophical. I am approaching zero confidence in the ability of a public body to make appropriate targeted investments.

This has come up in terms of like industrial policy and so forth on a number of occasions. I think that is far better left to the private marketplace to determine what the potential winners are, by people who have been in the market, have had professional careers in those markets, and can see what those kinds of technologies can and cannot lead to. And one commendable example of Federal participation in markets has been the SBIC Program, not so much the past but what has recently been done to modify that.

The SBIC Program has been a very minor player in the grand scheme of the institutional venture marketplace, but some of the changes that have been made will enhance the possibilities for a much more vital SBIC Program.

Thank you.

Mr. STANTON. I do not know this market as an economist might, but I guess I want to echo Dr. Wetzel's point, that the key is to target investments. And then the question is: Where can the government make a difference?

In other words, if the government ends up sinking its money into firms that fail anyway, we have not really helped a lot. If the government ends up funding firms that, in fact, were going to find angels, we have not made a lot of difference.

And so the task for Federal funds—and this is true of all Federal credit programs—is a very difficult one of finding that place. And that is why I like Dr. Wetzel's concept of being a catalyst more than just trying to make raw investments, of trying to improve the efficiencies, very much like some of the work you have been doing in some of your other legislation based on secondary market commercialization, where the government can facilitate more effective private decisions, maybe even through vehicles and SBICs I guess would be a good example, where you lengthen the time horizon that is available to investors, because that does seem to be a problem with the private market.

Chairman KANJORSKI. I think that is a good point. Philosophically, I come to the conclusion that there is not necessarily, in establishing the structure, a profit motive for the private sector to create a stock market for intellectual property or create a market for bringing the angels together. Perhaps the investment banking community's interest would be to discourage that, because that focuses the importance on them as the decider.

I guess what I am looking for, when I talk about venture capital, I am not really talking about how you finance a McDonald's in a local downtown area. That is hardly what we are after. We are trying to develop those technologies that we have in the hope creating a leap in wealth.

I think it is already happening. Clearly, we are seeing a revolution in the communications field. Some people look at that as just an investment. And I myself, in viewing it, see efficiency of the use of capital in so many areas that I feel that the exponential explosion is going to occur in the country simply by the fact that we are putting people together.

The airlines may look at the communications revolution as a loss of 40 percent of traffic, if you will. I look at it as an ability to communicate so much faster and use executive talent and scientific talent to create wealth and productivity generating efficiency.

I guess it depends on whose objection gets gored. I am acutely aware of the political pressures. If we create a governmental entity we may wall ourselves into a comfortable area where we are not impeding on anybody or the private market and we will not be accomplishing very much.

Maybe I am still 1950-ish, obsolete from the standpoint that I really do believe there are an awful lot of good ideas in garages and with the technological revolution and sophistication inherent. You used to be able to walk down to the local banker, if you tinkered and came up with something, and if he would not help you, he would at least give you time to put a financing scheme together; and the local lawyer would do the same thing.

But the local lawyer now charges $300 an hour now, and you are a cash cow. The banker is no longer a local banker. He is on his way throughout corporate structure, hoping to head toward Pittsburgh or New York. There is no reward for him or career benefit to nurture a company along.

Certainly, government cannot do it. But I am looking only at what we can do, which is to establish and create information fields, markets, bringing ideas together.

Part of the thing we talked about, the data bank, we already have that capacity. We have 1½ million technologies, research and development projects that we have funded either totally or partially in the Federal Government. And if you started today, you could not find them, because they are not in any one central place. You could spend a lifetime going through to find something.

So often, I will talk with the scientists at MIT and maybe a month later I will talk to a scientist at the University of Florida, and they are working on identical technologies, and they have not the foggiest idea that they are both working in the field. And sometimes it is a waste of resources and a waste of thought process because they could have complemented each other, and we just have not put them together in the system.

Now, we have had—and someone mentioned it in their testimony—the CRADAs. In a way, I am not sure that is an alternative that is being looked at to save the national laboratories—a way to tie them in with an income producer, if you will. It may be some form of welfare as opposed to real development.

And it is very lopsided. Very lopsided. Those that have, have an opportunity to get. It is not opening up the marketplace to the young scientist or the young manager in a defense industry at 50 when he feels like he would like to start his own business. He really does not have that opportunity today. I do not think most people would know, Mr. Maheu, how to go about financing a business. They probably would have to spend their life savings or their equity to find out how to do it, where to go.

With government work and patents and licensing, we do everything on a one-by-one custom basis. So the only people that really have access to the wealth of government technology are very large corporations. And a few knowledgeable people within—in the area, in that field of concentration.

Some of the scientists that have worked on these things, I find them to be interesting people. They come up with very good ideas, sometimes. But they become very protective of their idea. And they dream about being a Mr. Lance or a Mr. Gates. They are just convinced they are not going to share that with anyone else, particularly an investment banker.

So the idea never really goes anywhere. But it does afford them the opportunity to get grants to continue to work and publish and feel important in the field. They go on and on, indefinitely spending money; and nobody cuts them off because the research is pretty good. But it never goes anywhere. It is never going to be implemented.

We have to find some way, it seems to me, to use government as a tool but not to suppress the private ingenuity. That is what our little contribution, I guess, is here. If we could find a way of letting all this knowledge be known. I do not know about other people, but I gain most of the insight on what is happening in this country through Discovery and through CNN; if you watch enough of those things, you can pick up where the field is.

Other than that, unless you are a scientist in the field or an expert in the field, you really have no awareness of what is going on; and you have very little cross-pollination. If you have a problem and you are a small- or medium-sized business and somebody has solved that problem but in another approach that could be used in your field, you are not aware of where it exists and you could not possibly get through this maze down here into the Federal system and find out where it is, so to you it is a loss.

I am not looking at funding experimental, large entities. I am really at that first-grade of venture capital. I had a dream at one time before we put this legislation together that we could give it to guys on Wall Street that had made it, if you will, those that are already millionaires and above and now wanted to do something for the system and particularly for our economy, a Supreme Court of, if you will, of elders, of investment bankers, that would be targets for ideas and use their expertise. But that would be in a dream world.

The fact of the matter is, our system is sponsored by return. That is why people work hard, and that is why they think hard. They are perfectly selfish. But there has to be a profit motive. I am a little suspicious of our attempt to use the nonprofit corporation in a way—or in the State—because of what I find in Pennsylvania, at least—I cannot cast aspersions on Maryland—but it tends to be a vehicle that puts in a dribble or a drab to keep the hope going, but very often it really is not the best technology, the best businesses that get started; it is that one that can tap into the system and pick up $50,000, $75,000, which today, in most technology fields, is hardly useful.

Part of the testimony in one of our prior hearings was that there really is not the problem in funding under $500,000, you can find that from your family, your friends, some excited people that are in it. And once you get something that demands $15 or $20 million, you can afford the expertise to package it and peddle it on Wall Street.

Our problem seems to be between the half million and the $15 million or $20 million. There is not a place for people with good ideas or opportunities to easily get a hearing and get started.

Then relating that down to what we have done in government, I mean, over 30 years, now we have had 1½ million research and development projects; and this year, we are continuing on 140,000 of these projects. And there is no—when that grant is made, there is no plan to market, there is no plan to commercialize. Yet, people that are getting those funds could not see a good business proposition if they walked into it.

And as a result, it is like putting out money. You could turn around and say, we are not going to do that, we are going to give income tax credits. It seems to me the problem there is that those who have, will continue to have and grow.

Mr. McCarthy—I am not going to cite you, but you are in the black community. I am very disturbed at this point that my colleagues in the Congress and the Black Caucus, the young ones that have come here, they do not want set-asides anymore. They want opportunity. And, quite frankly, I think the recovery of our center cities and our impacted areas, they have got to have the ability to get into the business and be part of it and not because they are an identifiable segment of the community. It is that they have a good idea; they can put a management team together and go to work and get it.

And after that, you do not have to have districts apportioned for representation. You will have people rise to the level by their success. And that is what our system is about.

So in a way, I am trying to move away from some of the things we have assumed. But I am not a free marketer. I am not sure that the free market is going to make the investment and see the opportunity, and that they will—a perfect example is Stanton. The free market left alone to create a secondary market for business loans will occur. There is not any question about it. It is already starting, and it will grow. I think if we set up a system that they can operate, we could cause it to move, as Fannie Mae did, very quickly, and show the need.

Who mentioned in the testimony the need to appreciate intellectual property's value for financing? That is a real problem. I mean, the typical commercial banker, you are absolutely right, bricks and mortar, he understands that so well. He could walk across a Gates and a software program and never come to a realization there is any value there.

Dr. Wetzel, the angels you talked about—my director is curious as to who these angels are. As I understand your testimony, these angels are private, successful, wealthy Americans who have made it one way or another, maybe deca millionaires, centra millionaires that in order to avoid a 3 or 4 percent return on their money, are speculators enough that they think they can see a good thing and they want to find projects to invest in.

Mr. WETZEL. That is correct. For at least a fraction of their net worth.

Chairman KANJORSKI. Do they do it straight?

Mr. WETZEL. Yes. Because that is how they want to provide their know-how. They are only linked now, but—I have got to be honest. What is a gnat on the rump of an elephant, these experimental venture capital networks.

Chairman KANJORSKI. The people that are interested in our concept of the technology transfer corporation are exactly those types of people. They see this as an opportunity, and they are willing to put that venture capital together. Then you attract the large companies.

The problem is the large company, it is too much of a risk for them. They are making their 20 percent on the bottom line, and that is what they have to do to keep their stock in the market stable. They cannot afford to peel off money. I agree with you. I just know hundreds of these people that would take 10 percent or 15 percent of their net worth, play with it and are very successful.

Mr. WETZEL. It is also referred to as "adventure" capital, but that is how they look at it.

Chairman KANJORSKI. Some of them have been getting into licenses in the investment corporations. We have changed it a little bit, but they are still restrictive, these corporations. They have all these restrictions.

Part of our thought processes here was bringing that element into the fourth leg of the financing tool and set up. We would have a national registry, they would participate in these loans and use them to assist a filtering mechanism. But they are not the best filtering mechanism.

How do we bring the investment bankers into the process?

Mr. MAHEU. I suspect the real investment bankers at the level of money we are talking about is too expensive a proposition, and there would not be enough money left in the company.

So in going through this process, I reasoned backward to that in the $500,000 to $1½ million, $2 million, $2½ million range, a typical investment would be anywhere in there, what we need to do is we need to, in my view, create an independent board that would allocate—not allocate, but would have independent people who are experts at this, who understand how to get at an investment opportunity and evaluate the commercialization opportunities in that, evaluate the management team, evaluate the risk that still remains in the technology, evaluate the risk that is in the marketplace in terms of competitor responses or alternatives to that particular product or service, and at the end of that assessment say, this particular opportunity is worth $1 million or $2 million or whatever it would be.

And if we create a vehicle that independently solicits RFPs, "requests for proposals," in bite sizes that would be manageable for these companies—we recognize their management fees would have to be a little higher—maybe instead of 1.5 to 2 percent, which is typical range, maybe 2.5 to 3 percent, because the smaller the investments, the more time required. And the greater resource for a venture capitalist is his time that he spends with the company, not necessarily the funds that he has put in it. And we gave them the carried interest so that their win is—if the portfolio that they manage is the win, then there would be a large interest in participating in this; they would be independently looking not only at the technology that exists in the government's inventory but that exists outside the government as well.

There may be far more opportunity there than in the government.

Chairman KANJORSKI. I would like to add to that. The Fortune 500 companies have an inordinate amount of patents that they go through and judge they are not going to develop but look like they could be commercially successful and great contributing patents. Westinghouse recently has done that. And they made a policy decision that they want to help Charleston, South Carolina.

So the patents they clearly are not going to develop, they make available to an entrepreneur for $25 a patent, select whatever they want, on the condition they locate in that area around a major installation of Westinghouse in Charleston. That struck me to think that the tool we are constructing here, because it would be a private corporation, is not restricted only to managed government; it can go to the Fortune 500 or the 10,000 companies and say, would you like us to market your inventories? Those patents you are not going to use, could we go through and see if there is some potential there? And can we market that for you?

Conceptually, this Discovery-type channel that would be limited in the amount of technologies that it could put out in a given year, would have a second menu channel if you will, as soon as interactive video occurs, and the information highway occurs, that you could come in through a PC, and go through the menu, or with a key word, and study any number of the million ideas or patents that exist.

Basically, you are creating a tool for existing ongoing businesses that have had a measure of success and want to branch out, that already have the management team in place, have some capital but would probably need some more. But they will have a source to get to it, rather than my experience, which has been that batting down the walls to find something good and then going through the custom nature of trying to find out who has the power to sell it and who has the power to negotiate it so that, God forbid, when you get into the battery of government lawyers they will want to guarantee that the Sun will rise tomorrow. It really frustrates most people.

I think it is a limiting characteristic that drives most people out of dealing with the government, the whole market. But I am not at all surprised to see people who have told me they have expended half a million or $1 million with no success of getting a license or getting to the contract stage.

Because, again, the impetus in government is not to sign a contract. If you sign the contract and make the deal, you have a risk. If you do not do it, you don't have a risk.

Mr. STANTON. If I can only respond. You are absolutely right. But government is gummed up and procurement is gummed up. We have got to handle that. There is no question.

And that is this whole impetus for reinvention in sort of freeing up government. I guess my concern—and I keep coming back to it—is that private people may not act the same way when they are dispensing federally appropriated funds and when they are operating in the fishbowl that is a congressionally chartered corporation.

I am only concerned to say, just to hang out the yellow light and say, caution, you may not get all of the benefits of a private Westinghouse.

Chairman KANJORSKI. I agree. Let me ask that question. How can we find a way to get some recovery? If we start with the proposition that if we were to take all the government technology and we gave it to Mr. Maheu's company, do you think that some constituents in my district may find that offensive? I mean, we have just deposited 1 trillion or 2 trillion dollars' worth of government expenditure.

The process that we are trying to go through is, how do we get a potential for a reasonable recovery without trying to think ahead and put a value on something that nobody really knows what the value will ultimately be?

Mr. STANTON. I guess this is a question, because I have not studied it, but it would be my assumption that a Federal licensing or sales agreement of a Federal technology could definitely have the equivalent of an equity kicker in terms of the Federal Government's returns if, in fact, that technology took off.

I believe that one does not need the corporate structure or some of the other attributes in equity holding, whatever, in order to get that Federal upside for the technology that takes off, with the understanding that the Federal Government is not going to make a lot on the ones that do not.

Mr. WETZEL. I think technology is a sterile resource until you get somebody to do something with it. I think just making it freely available is probably the most productive thing you could do. And then after capital, time is the scarcest resource of these entrepreneurs and technology based ventures.

If they can conveniently access technology that might strategically fit where their technology is going, I think you could get a magnificent multiplier effect out of this process.

Chairman KANJORSKI. It is fair to give it with some condition of return of equity for the government or the investors.

Are you suggesting, Doctor, we just hand it out?

Mr. WETZEL. I tend to be inclined to give away the store more often than not. But, no, I would suggest some kind of appropriate licensing fee would not be out of order at all. That is typically the way a lot of these things are handled.

Chairman KANJORSKI. Rather than a fee, I was thinking of having the corporation authorized to make a lot of different arrangements, depending on what fits the case. But one part of it would be the potential of saying, hey, you know, 10 percent equity in whatever this does.

Mr. MAHEU. Mr. Chairman, along with that regard, we need to understand the exit strategy, that is what is the vehicle that is going to fund that return. If you have an exit strategy that is at 10 percent of cash and it is a high growth opportunity, then we have made a serious mistake.

Chairman KANJORSKI. And 10 percent of the stock of the company.

Mr. MAHEU. Right. If you do it through—that is a possibility.

Chairman KANJORSKI. Convertible bond or something.

Mr. MAHEU. We have to understand the concept, though, of dilution. My view of how you create value is you remove risk. The more risk you overcome, the greater value you have created because you can seize that opportunity in the marketplace. And the formation of the risk is greatest, obviously. So if you give a technology that works, you have removed one of the risks. But the commercialization of that technology, the marketplace risk, the competitor risk, the capital risk——

Chairman KANJORSKI. How does the giver get compensated.

Mr. MAHEU. Usually, what is required is additional rounds of funding. No one is going to fund it from cradle to grave at the first stage. So you have the automatic dilution of values over time as the capital provides more ability to succeed and reduces some of the capital risk of success.

So as other people bring other things to the table, you would have to be diluted out just like any other interested party.

Chairman KANJORSKI. But——

Mr. MAHEU. I do not mean to zero—I mean to the appropriate position.

Chairman KANJORSKI. And we are going to make some mistakes and people are going to walk away. But the AZT experience is a perfect example of what really gets a negative reaction from the average taxpayer, for the government to be a player in this and then allow something like that to escape out the door.

I think the reason it escapes out the door is the people over there negotiating are thinking of the national policy considerations of getting the treatment as opposed to what the profit may be in the treatment and whether there is a payback for the investment that the government made.

And I do not think we can lay down rules. The market is so diverse and requires total flexibility that, rather than sit down and say, there will be 10 percent on energy, or 30 percent on this or it will only be through convertible bond or through options—since the corporation would be basically owned 60 percent by the U.S. Government, 40 percent by the people that run it, and put up the capital to operate it, their return is also gauged on how they negotiate that deal.

If they make the price too high and nobody comes and takes the technology, they are going to go broke, and they are going to lose their money. Their interest is to get the technology out there and get it out in an operating organization and to follow through and call periodically. How are you doing; if you are successful, what can we help you out with for the next stages of venture capital or can we direct you to the proper or existing markets for that.

In other words, the success of the entity is their success; and the loss of that entity for any one of the steps that they go through causes the corporation to lose.

Mr. WETZEL. I think most investors and entrepreneurs themselves, in particular, are going to be much happier even though the cost may be greater with a royalty at the top than giving up a piece of the company.

I think that is a psychological as well as financial issue that needs to be dealt with.

Chairman KANJORSKI. I think, to some extent, it depends on how big a player comes to the table.

Mr. MAHEU. From my view, that is absolutely correct. But how we structure that royalty stream is critical to the ongoing success. I have been around too many biotechnology and licensing deals where it is a percentage of sales dollars which renders the company competitively disadvantaged as the market matures, number one, and number two, that cash-flow makes it a very unattractive vehicle to get public monies in if it is too high.

Mr. WETZEL. It might even be capped at some multiple—at some point.

Chairman KANJORSKI. Please jump in, I tend to talk an awful lot. Suppose you have—there is a technology, a patent, number 5 million, held by the University of Florida; it is an enzyme that converts cellulose to glucose in a common atmosphere, with bacteria present, converts that glucose to ethanol in one singular process.

It is not new from the standpoint that the concept has been 20 years in the process of being worked on; but now, through genetic engineering, they have increased the efficiencies to such a level that they are very high. Most people consider that they do not have to go a lot higher to be very commercial.

The problem is, OK, maybe the assumption that that technology is held by the corporation as a sole agent to the deal. Well, now, you come in. Do we give you just Washington, DC? Do we give you the Northeastern United States? Do we give you the whole country? Do we give you the whole world?

Of course, everybody can walk in and say, I want the world rights and here is my $10,000 check. But on technologies that could be that large, that literally could be a $1 billion business, if it ever really is taken to its full extent. Then there are other technologies that are very limited in scope as to what they would be used for.

By turning it over to a private corporation that has private money involved, they have got to think that what is good for me is good for the government; what is good for the government is good for me in making all the decisions that would be made.

Now, I heard some numbers, and let me get back to those. Did you say there is only, in venture capital $4 billion a year in the good years?

Mr. MAHEU. That is in the best year.

Chairman KANJORSKI. And under in the worst years?

Mr. MAHEU. Since 1980.

Chairman KANJORSKI. You mean that first startup capital?

Mr. MAHEU. I mean the pool of venture capital, at all stages.

Chairman KANJORSKI. That is all there is in the United States?

Mr. MAHEU. That is correct. In the private venture capital, listed annually.

There is a lot of other nonpublicized——

Chairman KANJORSKI. Is that the angels you are talking about, Doctor?

Mr. WETZEL. That is part of it, yes.

Chairman KANJORSKI. The angels, do they have money that is not reported?

Mr. MAHEU. Corporate venture capital would be another example.

Mr. WETZEL. Right. I was about to say the same thing. There are no public records of angel investments. It is an invisible market. There is no "Pratt's Guide to Angels" as there is to venture capital funds.

Chairman KANJORSKI. Would you have any way of grading—how many times greater is the angel market?

Mr. WETZEL. These are educated guesses. And I can say that, with some degree of confidence, because nobody can prove me wrong, but I suggest to you that the annual dollars invested by angels, instead of being $4 billion, is closer to $10 to $15 billion. So it is—$10 to $20 billion. So it is about a 5 to 1 difference of magnitude.

More importantly, angel money goes out in smaller amounts, $250,000 $500,000, as opposed to $2 million. So the number of companies funded is many more than 10 times. It is probably 30 or 40 times as many companies. I would suggest 30,000 to 50,000 companies as opposed to the $4 million that goes into roughly 2,000 companies, and two-thirds of those are in the venture capital portfolio.

Chairman KANJORSKI. In our bill, we anticipate that infusion of about $3 billion of Federal funds. We found a mechanism for that, so that does not cost the budget anything.

We are closing the loophole created in the fund. Then we have looked at the experience of EDA, their loan, business loan, Loan Guarantee Program; and they were able to leverage about four times. They found their risk factor they had to cover was only 25 percent in their worst years, and they were very successful, if you take out when politics got into funding the steel industry.

If we rip out what we did to them on the steel industry, they were a very profitmaking source for the U.S. Government and for the Commerce Department through EDA. If we put $3 billion on the table through the tax vehicle that we have, that would tend to create a level playing field for general business in the United States. That could create as high as $12 billion a year in funding. Is that too excessive?

Mr. MAHEU. I am not sure I understood your math on the $3 billion to $12 billion.

Chairman KANJORSKI. The $3 billion——

Mr. MAHEU. Would EDA have some loan aspects to it?

Chairman KANJORSKI. What we do is make the $3 billion available for financing and then use the equity potential that the corporation has in the investments and leverage of the secondary market to bring in private capital to about 75 percent or two to one; something like that.

Mr. MAHEU. I guess I would have to better understand that to be able to comment on it.

My view is, this market cannot use leverage. It is not available. You need risk, long-term patient understanding, value-added capital to succeed in this end of the market. And my initial reaction would be that if $3 or $4 billion were to come leveraged by any factor on an annual basis, it would create a temporary imbalance in the supply-demand equation; and I do not think the infrastructure is in place to deal with that level of investment initially.

Chairman KANJORSKI. Well, say, over a period, you have to build up over a period of 3 to 5 years.

Mr. MAHEU. It would not surprise me that there would be years in which flows into the venture capital and then directed into the appropriate segments or stages of development as we describe them that you could expect $1 billion, maybe $1½ billion with some leveraging; but beyond that, I am not sure that the facilities could handle it.

If we look back to the mid-1980's when this market was very hot and where the monies flowing into this market were far in excess of historical levels, what we saw was tending to fund the more marginal deals, which caused later returns to be unattractive, and a dissipation of monies available in this—therefore, the cycles I was talking about earlier—so we need to do a little balancing.

There is a level of monies that we could put in here and continue to put in and continue to roll over. The numbers I am hearing, based on anecdotal evidence, a little bit of empirical evidence, concern me; we would flood the market and create an imbalance.

Mr. STANTON. Mr. Chairman, if I might, on an unusual point here once again, under the Constitution no monies may be withdrawn from the Treasury—and this fund, under this law, is in the Treasury—except with a congressional appropriations act. So once again, even though this corporation has a private management, private board of directors, they are going to be dealing with the appropriations process potentially in an even——

Chairman KANJORSKI. The Technology Investment Fund would be the funding vehicle, not the corporation.

Mr. STANTON. But the fund—expenditures from the fund to commercialize those technologies that the corporation has, even if the expenditures are nominally made available to the corporation, are going to go through the Federal appropriations process in a potentially more cumbersome way under this legislation than if you had a Federal corporation that was designed with a self-sustaining stream of income, with a revolving fund.

There are various ways to structure it. You still keep it subject to credit reform, which is what you were mentioning.

But my point is, again, and I am sorry to have to keep coming back to it, this will not be a private Westinghouse that is free to deploy its assets and take risks and figure out, that it wants to take a long-term bet here. We are going to have an appropriations subcommittee someplace saying, but what about my State, what about my district? What is going on here? And this—I have to come back to the fact that we are stuck.

Chairman KANJORSKI. Mr. Stanton, I have to explain my concept of it.

The American technology network and the technology transfer corporation would work in tandem, a private-public venture, 60–40. The funding, the equity funding would come from a separate entity attached to it in terms of being on the same assembly line, but distinctly different, having some of the characteristics that Mr. Maheu is talking about, either a superior council that would be in charge of determining who has the final say or to use small business investment corporations, to bring them in, or develop an open market policy to entice the private venture market.

Now, the corporation is needed only to get the broad exposure of marketing; and second, the vehicle to cut the red tape in getting the deal cut for the technology, not for the funding of it. But then, rather than have the investment banker go through the whole process again, there would be a relationship that you could rely on and not have to waste the time that the government has a tendency to do.

If the government picks something up, they do not rely on anyone else's work; they tend to restudy the thing. Well, we do not want that to happen. That is not necessary. We want to cut that down.

What we really want is some smart investment banking judgment, but have a—when it is repackaged, a yes or no decision and a reliance on the information gathered, rather than having a redundancy of organizations doing the same thing. We do not want to create another Small Business Administration, another Economic Development Administration.

Mr. STANTON. All I am saying is that in order to get money out of this fund will take a congressional appropriation that will have as much specificity as any SBA or EDA appropriations act will have. And I am just trying to say, I understand completely what you are trying to do, and I do not want to stand up here and say government is the best answer. All I am saying is that, in fact, one runs into oneself when one tries to combine governmental and private attributes in an institution, unless one is very careful; and I am simply trying to raise issues that are part of that careful deliberation.

Chairman KANJORSKI. I appreciate it.

Dr. Wetzel, what is your thought of Mr. Maheu's idea of leveling out of valleys?

Mr. WETZEL. I think he is right on target. There have been these valleys and an excess of money chasing bad deals, and there was a lot of poor performance, and we are still recovering from that; so I think there is good deal of merit to that.

My field of expertise is not really, although it is tangential to that, directly related to the institutional venture capital area; but the ups and downs have been substantial over the 1980's, reaching a peak in the mid-1980's of $4 billion invested per year, if I am not mistaken, down to a couple of years ago where it was well below $2 million right at the time when we needed it most, when we were trying to recover from a recession.

Chairman KANJORSKI. Was that because there were no takers or no money available?

Mr. WETZEL. It was reflection, I think in part, of the poor returns that have been generated by the surplus of funds earlier in the year. Remember that a number of investors in these institutional funds are institutional investors. The pension funds, the endowment funds, things like that rely very heavily on the so-called "gate-keepers," you might say, those who evaluate fund performance.

In the face of very poor performance on the part of the earlier funds, these institutional investors really withdrew substantially from the market.

Now, I think if Ron can comment on this, I think they are now coming back into the market.

Mr. MAHEU. I would like to completely agree and supplement what Dr. Wetzel said.

The typical venture—private venture partnership has a life of about 10 years. They will typically draw down their committed funds over about the first 3-year period, investing those out into about the fifth year with a little bit of money for follow-on financing. They think, down the road, most of these ventures are going to require additional capital, so that under their plan, they will exhaust their funds and yield a return in a 10-year period.

If we look at the IPO market, it was very hot in 1982, 1983, 1984—I can remember all the companies I took public at that time—and therefore as the 1975–76 funds were cashing out, their exit strategy as these companies were being sold on the public markets, they had substantial returns that were very, very attractive to professional and other investors. So an enormous sum of money poured into the field at that point in time.

So now we are in 1984–85, and we have got not $1 to $2 billion annually, we have got a $4 to $5 billion angel, so if they have that money sitting gaining interest rate on U.S. Treasuries, it is a failure because they are committing 20, 30 percent returns. If you get 5 percent, you are missing the boat, so they have got to get them to work real quick.

So there is a real sense of urgency to put that money into investment opportunities, while the investment opportunities are not an everlasting demand curve here. So what happens is, you have more marginal investments that were being funded. Those take—there is a phrase in the venture capital community that "The lemons ripen early and the pearls take a little longer." So those lemons started to come home in 1989 and 1990; and lo and behold, the capital market saw the returns going down, and it fled to another investment vehicle, so here in the height of our need in the late 1980's and early 1990, the VC monies are flowing down.

An inducement there of this risk-type money could have certainly assisted that situation.

Chairman KANJORSKI. So you are really talking about an open window policy. Where would we put that open window since we do not have an organized regulator in the Federal area for venture capital, but we want to allow the venture capital companies to get to the Federal Treasury through some mechanism? How would we do that?

Mr. MAHEU. These things do not happen episodically; they are a trendline. My view, if we were all sitting here in 1990, we would have had a very distinct trendline that would have said the money flowing in here this year and in the next couple of years is going to be sort of what our ideal was.

Let's presume that was $4 billion. At that point in time, I presume we would have appropriated—however the government does this, I am just not familiar with this process—some monies. It would set up an independent board who would then send out for proposals to existing people with proven track records who are going to channelize the money in the stages of development that we want, ask them to compete, based on their performance and the carried value they will give back to the government, plus their management fees, which is how they cover their operating costs; and these independent people would make a judgment and allocate in $25 or $50 or $75 or $100 million pools.

There is some inefficiency when you get too big because of the size of investments and structure to those. I also think we cannot be so naive as to view that Congressmen aren't going to get some in their district, or Senators—rightfully so—and that is why we talk about the 80–20, where you may have a more narrow focus with a higher social and job content than necessarily an economic return on some piece of that portfolio but always keeping it as independent as possible of the bureaucracy and being driven by the venture capitalists or the people who manage this money really only make money if they are a commercial success and they have an exit strategy that proves the value is realized and that the monies they get in the interim are invested in the companies, or they merely cover their current operating expenses.

Chairman KANJORSKI. Well, maybe you can sit in as we bring Mr. Lee and Mr. McCarthy into this.

Do you have a large demand for venture capital? I mean, are there inquiries for venture capital? I am not talking about, again, the McDonald's franchise; I am talking about taking some new technology or cutting-edge technology or advancement in technology. Are you getting a high demand for this that you cannot fulfill, other than in the State of Maryland or Missouri?

Mr. McCarthy. Of course, in Missouri because McDonnell Douglas being the largest military contractor, you have about 1,800 subcontractors to them. And trying to do the conversion effort, trying to go to new commercial development projects, you have so many different developments; and trying to find financing—I get about three to four calls a week from the $1 million to $5 million tier of trying to negotiate commercial developments.

And the bank infrastructure will not help at all, so we constantly get calls for high financing.

Chairman Kanjorski. Where do you get them financed? What do you do? Do you go to venture capital?

Mr. McCarthy. We are dying to go to venture capital. That is why I made the suggestion to try to get the incentivized venture capital. The banks aren't going to do it.

Chairman Kanjorski. Do you have a good conduit? Is there a good network, or is it cumbersome or invisible, as Dr. Wetzel said?

Mr. McCarthy. That is my objective. I have been dealing with State, Federal, and local, trying.

Missouri is such a conservative market. When I compare the study showing St. Louis at 2.45 million people compared to Minneapolis with the same amount of money, you are talking $1.5 billion in venture capital in Minneapolis and $50 million in St. Louis. That is our baby as opposed to trying to get incentivized. We do not have a venture capital market in all the Missouri area.

Chairman Kanjorski. How do you know who to go to? Do you do the transaction or give the reserves?

Mr. McCarthy. We do it all—set up the meetings, try to find out who has the money, what type of technologies they are looking for. We try to do the whole bundle.

Chairman Kanjorski. Mr. Maheu, do you work with organizations like Mr. McCarthy's?

Mr. Maheu. We certainly have worked with incubators. We have worked with groups that have formed those businesses. We have published a number of brochures on the raising of venture capital, the price of growth incorporated venture capital, biotechnology into venture capital. Just as investors view this as an opportunity, firms like myself have specific strategies and tactics to viewing this as an investor; and while we will not blindly go on all 1,500 of his opportunities, we will try to put a filter on those, say which one of these is successful, because we are investing our time and money into there. Because we do it at substantially—we do it at rates that are very competitive, that are affordable for these types of companies, so we will not do it for everyone. We want to do it for the ones that will win, so we can have a payback as well.

Chairman Kanjorski. How do the angels get into this action? Where do you get ahold of any of Dr. Wetzel's angels?

Mr. Maheu. Dr. Wetzel's angels. If we get a movie program, we can get the royalties.

Mr. McCarthy. I definitely did some research into what Dr. Wetzel said, there is an invisible market of angels. I do not know who they are. I definitely understand the whole concept.

Chairman Kanjorski. How about Mr. Lee in Maryland? Do you have access to that special market?

Mr. LEE. I think the keynote of that market is that it is unpredictable. It is difficult to define and you find it episodically. We have worked with firms who have been seeking structure venture capital and who find it in various locations, that are unstructured venture capital. They find a guy that they knew in a company that they worked with who is now retired and has some money.

We were going through this sort of generic kind of description of how these guys find each other, but I think it happens and it happens without a great deal of structure; so the kind of thing that Dr. Wetzel is looking to do—this information network, I think, is a critical component. It is one that we are trying in Maryland through the Dingham Center for Entrepreneurship.

Chairman KANJORSKI. But you use some funds to inject into the system, to help the entrepreneur to put his package together, his prospectus together, to go out and market it to an angel; is that it?

Mr. LEE. I think that is the place where we have applied our money; it is at that early business formation point. Where $50,000, as you said, does not buy a whole lot in research, it can in fact buy a lot in terms of business plan development, market research, elemental though it may be, but essentially preparing them to either deal with fully capable venture capital firms or an angel.

Chairman KANJORSKI. Is that granted money or a loan? How do you——

Mr. LEE. We have played it in a number of different ways, and what we are looking at now is taking equity stakes in these kinds of businesses; but we have made it grants in the past.

Chairman KANJORSKI. Let me ask something that does become very apparent here. What is your experience, Dr. Wetzel and Mr. Maheu, do the angels want to invest where they live? In other words, does California stay in California?

Mr. WETZEL. There is a distinct geographic dimension to angeling. That is why I think a national angel network really needs to be built around areas of regional players backstopped by some kind of a national information flow system. It is not a full-time professional process for them, so they have to stay conveniently available to the ventures they back for the most part.

Chairman KANJORSKI. But they do favor local investment?

Mr. WETZEL. Absolutely. The only thing that tends to draw them outside, if they are a technology-based entrepreneur, if a California investor seems to find something interesting developed in Boston it becomes less of an obstacle. In general, convenient access.

Chairman KANJORSKI. How does the guy in Boston find the fellow in Los Angeles?

Mr. WETZEL. I can only give you a couple of examples where there have been west coast investors in east coast companies, simply because they found each other through the network.

Chairman KANJORSKI. How do they do that? Just word of mouth, I have got a good deal?

Mr. WETZEL. By registering with the network.

Chairman KANJORSKI. This is the MIT network?

Mr. WETZEL. Yes, and prior to the Venture Capital Network. I hate to use the analogy; I hope it does not appear in the transcript, but it is obviously going to. It is not unlike a dating bureau.

Chairman KANJORSKI. There is nothing wrong with that, is there?

Mr. WETZEL. It connotes some things.

Chairman KANJORSKI. Well, we know——

Mr. WETZEL. There is nothing wrong with it. You know what I am talking about.

KANJORSKI. You mentioned something, Mr. Maheu, about some ruling of FASB. How could——

Mr. MAHEU. We are going to get into a little bit of——

Chairman KANJORSKI. Lobbying?

Mr. MAHEU. Well, no.

Chairman KANJORSKI. There is nothing wrong with that word either.

Mr. MAHEU. We are going to get into a little bit of, I guess, technical matters, if I can just give you a little background.

Most technology companies are formed by a bunch of entrepreneurs who over a beer and a story and some information decide they want to form a business, and those we call the "founders"; they pretty much divvy up the company. But almost always that is an imbalanced team and requires substantial additional talent to be brought in.

And you attract those people, and all the ones you attract, you also want to talk about retaining them, which is pretty critical. But you attract usually those people that you need to fill out your team or to fill out a specific need, not in the form of a cash bonus or a higher salary than what they may be making in another environment where they developed the skill set that you need to balance this opportunity.

So you—they typically take on a little less cash, or maybe the same cash, but substantially a lot more risk because the viability of a company is at risk, the viability of the commercialization is at risk. Then you give them options. And, therefore, if the company is a shooting star, they get a piece of that. If it is a failure, well, they have made enough cash to cover the mortgage and the tuition and the food but probably not much else.

If in today's environment a company issues stock options where the exercise price is equivalent to the fair market value on the date of grant—or the "measurement date" in accounting parlance—there is no charge in the income statement of that company. It is viewed more as a capital transaction. The Financial Accounting Standards Board has proposed the issuance of any options in any form are a compensatory transaction; and therefore, what will happen is that you have to charge your P&L with an expense related to the value of these options that you gave to these management teams.

So we could end up in a scenario where a company, a high-risk company, a biotech company, could have a compensation charge related to its stock options in excess of its revenues. That is not a very attractive vehicle to go out and get money in the capital marketplace.

So if they are going to do that, then they are going to have to negotiate more cash.

Chairman KANJORSKI. How do they put a value though on a stock option when there is not a value on the stock?

Mr. MAHEU. Well, they have something that they have called the "option pricing method," which is a couple of MIT mathematics professors who developed some markets.

There are a number of us who feel those aren't appropriate vehicles for early stage companies. It may be fine if you want to go buy an option of a company traded in the open market for 60 to 90 days, where the opportunity can go up or down. You can sell the option tomorrow or in 90 days.

Chairman KANJORSKI. But when there is no market for the option, it has no value?

Mr. MAHEU. But they are saying there is a value. And value is a function of risk, but it is also a function of data, which just means the more it goes up and down, the greater the value. And it is also a function of the time's value. If you have that option for 10 years, it is an equivalent of getting an interest-free loan on the right to buy it at that price for 10 years. All of that works into a mathematical formula that says, there is a value.

You and I may be in agreement here, but other people who make the rules at the moment are espousing a different theory.

Chairman KANJORSKI. The receiver of that option also, does he have to include a value on it for tax purposes and pay a tax?

Mr. MAHEU. Typically, the receiver of that value, if it is an ISO, which is a special kind, he would not have to pay any taxes until sold. Only if sold, which is 2 years of—1 year of exercise and 2 years of grant. If it is a nonqualified option which tends to be the greatest use of this vehicle, it is usually taxed at exercise; but in those cases, it is usually in a public market; you can sell somebody your stock and pay the taxes with it, and so you do not have this charge.

But we could have a very, very substantial negative to the funds flow in high-risk companies, number one, and number two, we could have a very substantial—put a competitive disadvantage, so to speak, on our ability to attract and retain some of these key executives in these high-risk situations because if they are going to pay you now with more cash, why leave a mature, stable company for the high-risk cash?

Chairman KANJORSKI. I was going to ask Dr. Wetzel, though, on this idea he mentioned, capital gains board. In the Budget bill, we handled investment in small entrepreneurial operations and gave the benefit of a capital gain. Do you find the judgment used there by the Congress was good or is it too limited?

Mr. WETZEL. I think it was good, but it was too limited. It cut out a piece of the earlier bill which was referred to as the "seed capital provision"; the one that was passed was the so-called "venture capital provision."

The seed capital provision applied to the very early stage, small amounts of money in companies with capital structures of less than $5 million, and what it did was drop the capital gains tax rate on investments held for 5 years to the 50 percent level that it is now in these larger companies that have capitalizations of $50 million or less. But it went beyond that—and this is important for these early stage companies, that you really do have this patient money—and what it did was drop that capital gains figure from 50 percent down to zero, and in 10 percentage point decrements for each additional year. So if you should hold that investment for 10 years, you were taxed—were free of capital gains tax, and I would very much like to see that revived—that is in my testimony here.

Chairman KANJORSKI. And this, for the purpose of not causing the disturbance and instability of the new company that is coming, do you have to go to a new market strategy to get their capital?

Mr. WETZEL. That is correct. It is, as I say, a lot of blood, sweat, tears, and time to build a viable company.

Chairman KANJORSKI. I am one of those individuals in 1990 that voted for capital gains. I guess the reason for it was, so often I understood the concept of capital gains, and I think it is a very good stimulus, but it has to be controlled and directed.

Unfortunately, every time in this country when we talk about capital gains, every guy who has had a hit on the market in the last 10 years wants to cash in and get his money out. He drives all the good ideas out.

Mr. MAHEU. That is why the targeted investments are——

Mr. WETZEL. Starting is the key, right.

Chairman KANJORSKI. It is a private investment credit, if you will, to encourage people to go into particular job-creation, wealth-creation entities. Very worthwhile, leveragewise.

Mr. MAHEU. I would support Dr. Wetzel very much in his statements and would just supplement that. We need to examine a few things. Number one is, yes, we have reduced the potential for capital gains, if I hold for 5 years here from 14 percent. But the other side of the coin is, this is now subject to an alternative minimum tax, which can raise it back up to 21 percent if you are an appropriate angel; and most angels would be in that situation without a lot of earned income. We need to look at whether or not the alternative minimum tax works against our good intentions here.

The second attribute is, if I remember correctly, you are no longer eligible for this capital gain if at the time of the investment you have in excess of $50 million in gross assets. Now, that is wonderful for a software company, but that will not fly for a semiconductor company.

Chairman KANJORSKI. In the Secondary Market bill, I did not intend to bring that in, we have enlarged significantly on the concept that is emanating from the Senate, that we allow it to use the secondary market to create pools of any business loans, real estate, commercial real estate loans, and also equities.

There, I specifically put that in because we anticipate using the secondary market to create pools that would allow what you are talking about, Mr. Maheu, to let the marketplace level out that cycle?

Mr. MAHEU. That is correct.

Chairman KANJORSKI. Have you looked into that at all, or—I am curious as to whether that would work. Should we find someplace to——

Mr. MAHEU. I have no empirical evidence that says where that ceiling is, but what I do know from empirical evidence is that when this amount of money was more than the demand side of the equation could handle, the returns were precipitously falling and have injured this program for a period of time.

My view, we could do a study, and I would suspect there are some parameters, some corridor, within which there is a reasonable supply and demand equation with minimal, and we could forecast that level, and the trendlines are not so radical that it happens overnight. It happens over time.

Chairman KANJORSKI. You see it coming?

Mr. MAHEU. You see it coming.

Chairman KANJORSKI. I know you all are on a busy schedule. I appreciate your staying with us this long.

Who would be the expert that we could get in to determine how to get the angels involved and to create the network that we are talking about? The identity of the invisible market is there, someone out there that is really doing definitive work in that area—besides yourself?

Mr. WETZEL. This is obviously self-serving. Yes, you are looking at him—that along with the MIT Technology Capital Network, which is now at the conceptual stage, but would very much like to move forward.

Chairman KANJORSKI. Are they readily available to us at MIT? Who is in that program, you?

Mr. WETZEL. Absolutely.

Chairman KANJORSKI. Preston was the one who was going to be our witness. You highly recommend that as the cutting edge?

Mr. WETZEL. Absolutely, sir.

Chairman KANJORSKI. OK. Very good.

Well, I appreciate—does anyone else have anything to add? You know—we are in a field, I have to tell you, and you obviously have understood that from listening to my foolish questions—at some point the Congress has very little knowledge on investment banking, either on an individual basis or collectively; and this is probably an endeavor to try to get us up to speed on that.

So I appreciate your coming forth, one, to give us your expertise and I appreciate just having the availability of that type of knowledge out there. But I really think that we are at a new transitional period in government that we want to find user-friendly methods of getting the private sector to move and to make that flow flexibility out there, if you will, of capital.

And anything you can do—if you come upon a thought or an idea in the future, or in some of your readings or experience, if you would just stay in close contact with the staff of the subcommittee and myself, I would appreciate it. I think we have this window of opportunity over the next 6 to 9 months to put something together that could materially affect the economic growth of the country.

Mr. WETZEL. I think you are absolutely right.

Chairman KANJORSKI. I thank you.

[Whereupon, at 2:40 p.m., the hearing was adjourned.]

APPENDIX

November 16, 1993

Opening Statement of

Congressman Paul E. Kanjorski, Chairman

SUBCOMMITTEE ON ECONOMIC GROWTH & CREDIT FORMATION OF THE HOUSE BANKING, FINANCE AND URBAN AFFAIRS COMMITTEE

Hearing on

Equity Investments, Venture Capital, and the Federal Role in the Availability of Financing for High-Technology Companies

November 16, 1993

The Subcommittee meets today for the third in a series of roundtable hearings on the potential for stimulating economic growth and new job creation in the United States through Federal technology transfer and private sector commercialization. Today we will be looking at the role of venture capital financing and equity investments in the development of new and existing high-technology companies and entrepreneurial activity.

Few analysts will disagree that small businesses and entrepreneurism are at the forefront of U.S. technology commercialization and business development. The 1990's has been cited in several recent publications as being the "decade of the entrepreneur." The Administration has initiated several important programs designed to assist and enhance technology transfer. Yet, even with these initiatives, many small businesses will probably need to hire a consultant to sift through the maze of government bureaucracy. In addition, the availability of capital, which is so critical for business development and commercialization, is still frequently an insurmountable obstacle.

We have asked our participants today to help us examine options for making credit more available to facilitate the commercialization of new technologies. In particular, we will be discussing the possible role of the Federal Government in offering venture capital and equity-type financing for business development. For example, does the opportunity for Federal profit-sharing and non-voting participation in a developing company offer a viable additional financing tool, along with more traditional forms of assistance, such as loans, loan guarantees, and grantsmanship?

Joining us today are representatives from several state, local, and university led initiatives directed at analyzing and facilitating the financing of high technology business development. Although Mr. John T. Preston, Director for Technology Development for the Massachusetts Institute of Technology, had originally intended to participate in today's hearing, he regrets that pressing business in Cambridge will keep him from attending. Without objection, we will submit his statement for the record.

I would like to thank all of our participants this morning for taking time out of their busy schedules to meet with the us, and we welcome them to the Subcommittee.

Ronald T. Maheu, Coopers & Lybrand
Co-Chairman, Technology, Venture Capital and Graduation Strategy
November 16, 1993

Testimony:
Subcommittee on Economic Growth and Credit Formation
Committee on Banking, Finance and Urban Affairs

- Mr. Chairman and Members of the Committee, on behalf of Coopers & Lybrand I appreciate the opportunity to explore with you ways to invigorate our economy. I will discuss the present venture capital initiatives, equity investment options, and the future Federal Government role in the financing of high-technology companies.
- The Federal Government serves a vital role in creating and preserving jobs for its citizens and economic growth for the nation.
- I will offer some ideas on how -- by providing marginal risk capital -- you can help create, preserve and promote predictable and accessible risk capital that creates jobs and economic value.
- As a country, our policies should be directed toward eliminating any disadvantages to our competitiveness in the global marketplace. Capital, the lifeblood of economic competition, is fungible. Therefore, we must provide incentives to generate and perpetuate risk capital availability to our nation's most promising enterprises.
- My summarization presents a method to fuel our economy and provide jobs through independent management of risk capital.
- Why not let independent, private venture capitalists compete for government funds to finance those patents, licenses, and technologies and bring the resulting economically successful companies to the marketplace?
- Congress' role should be to provide a policy umbrella that increases -- and a level funding mechanism that supplements -- private capital flows for high technology companies.
- Let us not be naive.
- Capital will flow to wherever it can best reward the investor.

- **But, as elected representatives, Congress has the power to change economic, banking, capital formation, tax, treasury, antitrust, trade and social policies to ensure the influx of capital that will drive our economy.**

My vision is expressed in the following way: There are a number of macro- and micro-economic and business factors we need to consider. From the macro perspective, as we've already discussed, we compete globally in the capital markets where money flows are fungible, and cross international borders instantly. The result is that capital flees to the investment opportunity that offers the greatest after-tax return. And returns, both before-and after-tax are impacted by our government policies versus those of our global competitors. Any of our policies that are enablers in attracting funding need to be reinforced or put in place, and any that are inhibitors, need to be eliminated.

My point is that we must focus on creating and competing on a level playing field. This requires not only the macro perspective, but also the development of tactical policies and plans that create a strategic umbrella that removes competitive disadvantage for American companies. In order to accomplish this objective, we need to address existing policies to determine which are outdated and which are enablers that should be supported. In addition, we must create other policies to eliminate competitive disadvantages in the global marketplace.

From a micro perspective, I'm going to assume that the issue of access to the technology is addressed in presentations by other members of this panel and in previous sessions as detailed in your Congressional Record. Therefore, I will address the financing aspects of the overall concept that you have put forward.

I submit there is an existing model that is unique and extraordinarily successful: that model is the private venture capital industry in America.

By way of background, venture capital is most successful when there is a balance between the supply of funds and the opportunities to invest in entrepreneurs running high growth, high risk companies. This balance is critical, because an oversupply of available money to invest results in marginal companies being funded, which lowers overall returns and ultimately lowers the future inflow of available risk money to fund the next round of technological opportunities. That fact is well-documented by the history of the venture capital industry in the mid 1980's. Conversely, too little money available means that only a select few opportunities are funded.

This could result in missing some very good opportunities during periods of tight money.

Therefore, the long-term balance of the supply of capital and demand for investment opportunities in the venture capital process is critical. It is well documented that the amount of private moneys flowing into venture capital varies from time to time. The supplemental and leveling role the government can play, and we are discussing today could provide greater certainty to the amount and predictability of funds over a longer period of time.

By establishing consistent, overall availability guidelines, government funds would be used to supplement any shortfall in available private moneys. After determining that a gap exists, the critical question is how we manage the investment of government funds in filling that gap.

I am suggesting that an independent board be appointed to evaluate proposals from successful independent venture capital firms. The board would allocate a portion of these "gap" funds to a number of venture capital firms to manage in their traditional market-driven and independent manner.

This vehicle is in place--no additional bureaucracy would be required. The venture capital industry is driven by global economic market forces and, more importantly, has an exceptional proven track record.

Its successes would not only create jobs, but also continue to grow the value of the initial "gap" monies so that they are available in ever increasing amounts in later years. To borrow from a parable, we would create a process that teaches the hungry how to farm and not a process that gives them a meal.

The amount of the "gap funds" could be allocated in such a way that the larger portion--let's say 80 - 90%--would go to the private venture capital community via this independent method. Each fund would compete based on their investment criteria, their track records and, their success for a portion of the "gap" funding. Each fund would then be given the opportunity to realize traditional returns, resulting from the achievement of investment objectives.

The second and smaller portion of this fund would be applied to not only return the invested capital through successful company and job creation, but also to achieve an additional goal of reaching certain social- or geographical-driven objectives. An example of this is the Massachusetts Technology Development Corporation (MTDC). In this instance the State created a vehicle and provided capital for a venture fund, independent of the government and political process, because it is managed by professional investors. They were given performance measures that were not limited to financial returns. Additionally, it was stipulated that investments must be in a certain segment of the market–limited in geography to the Commonwealth of Massachusetts–and the investments would also be evaluated for their success in creating jobs within the Commonwealth.

There are several key reasons for the success of MTDC: First, the process of investing is independent. Second, to perpetuate themselves, the funds must yield appropriate financial returns on the invested capital. Third, a stated objective is to strengthen the Commonwealth's economy by creating incremental jobs and economic value. I believe these two models, taken together, achieve the objectives that you're seeking.

Before summarizing, I would like to stress one further point. Upon execution of these suggestions, it becomes essential that these funded companies have the optimal opportunity to husband their cash realized and that our government policies – tax, accounting and others – be directed at optimizing the utilization of these funds. For example, tax and reporting policy should support the use of motivation and incentive schemes that encourage and reward successful completion of the company's key objectives by utilizing equity incentives, rather than cash. A current example that would have a debilitating impact is the Financial Accounting Standards Board's proposed opinion on accounting for stock options because it would reduce equity as an effective tool in the motivation process. This results in more cash being required to both attract and retain key knowledge workers. Thus a greater "burn rate" on cash long before product development and positive cash flows are achieved. The net result? Greater use of cash, more risk of failure, and lower probability of success until well into the mature stage of a company's life cycle. This is just one example of how many policy aspects can impact the delicate risk capital equation I've described.

Ultimately, the goal of this model is highly desirable. Its success depends on how well we execute national policies that offer this investment vehicle the greatest probability for success to perpetuate job creation while commercializing our existing and future technology.

If we keep this process in the private sector; reduce policy-driven inhibitors to investment; utilize proven, independent venture capital vehicles; and remain sensitive to the supply and demand issues of risk capital, we will have a dramatic effect on stimulating job creation and our economy.

A recent study done by my Firm, VentureOne and the National Venture Capital Association surveyed over 400 companies and reveals some interesting findings about the impact of venture capital on high technology companies.

This study illustrated that --

- Over 80% of the fastest emerging companies depend on outside equity to finance growth.
- Each company that received an average $1.5 million of risk equity generated approximately 140 new jobs annually each year over a four year period.
- But when that equity is available, these companies in total generate over 50,000 new U.S. jobs every year.
- And each company paid an average of $1.5 million in corporate taxes over the past five years.
- Therefore, if a "gap" of $500 million was filled in the manner suggested it would on average fund 330 companies that would create approximate 45,000 jobs annually.
- Since 1986, the pool of capital available to seed and support companies from traditional venture capital sources has shrunk by

nearly 50%.

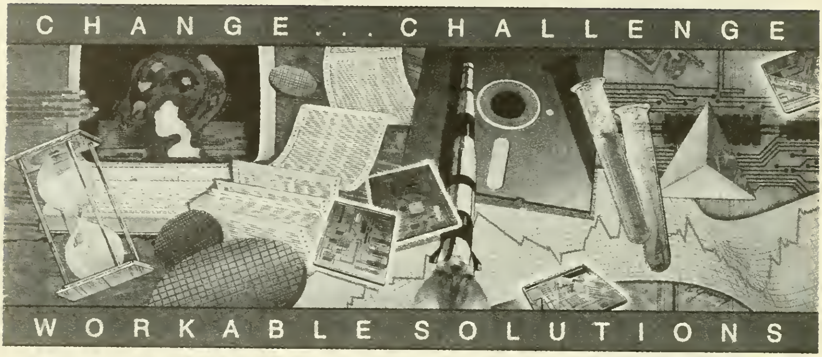
- I would submit that now is the time for the Federal Government to take the steps suggested to assist this situation, create new jobs, and refire economic growth across the nation.

- That concludes my overall strategy for financing high technology companies. I welcome the opportunity during the roundtable session to discuss this in further detail.

- Thank you.

Coopers
&Lybrand

Venture Capital:
The Price of Growth
1993 Update



NOT JUST KNOWLEDGE. KNOW HOW.℠

A Message to Entrepreneurs and Venture Capitalists

In the past, little research was available to prepare entrepreneurs for the valuation they could expect from venture capital firms. With an understanding of how venture capitalists approach the valuation process and data regarding recent trends in valuations, entrepreneurs can develop realistic fund-raising goals. Venture capitalists also benefit by seeing how daily decisions translate into pricing levels within their industry.

Exchanging shares of ownership for much needed equity can be a complicated and emotional process. To facilitate this process, we are pleased to release our third study on venture capital financing of technology companies. This study reports transactions from 1990 to 1992 and combines data with our two previous studies to track pricing statistics since 1980.

Beyond its business value, this report also symbolizes a continuing alliance between Coopers & Lybrand, technology companies and venture capitalists. Coopers & Lybrand audits more of the top 100 venture firms than any other professional services firm and both our National High Technology and Entrepreneurial Advisory Services groups have helped thousands of emerging companies to raise capital for growth. Our technology partners and managers assist entrepreneurs in the development of a focused strategy for raising venture capital, review business plans, and introduce entrepreneurs to the firms most likely to invest in their company.

No project of this depth could be completed successfully without the direct input of several leading venture capitalists. We greatly appreciate the invaluable contributions and insights of our friends at Advent International; Asset Management Co.; Atlas Venture; Brentwood Associates; Burr, Egan, Deleage & Co.; Copley Venture Partners; CW Group, Inc.; El Dorado Ventures; HMS Capital Partners; Kleiner Perkins Caufield & Byers; Lawrence, Tyrrell, Ortale & Smith; Merrill, Pickard, Anderson & Eyre; Oxford Venture; TA Associates; Vanguard Venture Partners; The Venture Capital Fund of New England; Woodside Fund; and Zero Stage Capital Co., Inc. Jack Hayes, formerly of Venture Founders Corporation, also served as an invaluable consultant.

We would also like to thank Laura Ring of our National High Technology Group for her overall project management and analysis. Several others provided substantive assistance: our thanks to Jim Atwell, Seth Bagshaw, Brian Goncher, Robert Greenbaum, Larry Jones, Scott Lewis, Jeff Micheal, Jim Siegfried and Steve Wagner.

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Chairperson
National Venture Capital Group
Coopers & Lybrand

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I. Executive Summary

Coopers & Lybrand's third "Price of Growth" study analyzed 80 companies receiving financing during 1990 to 1992. Transaction details were collected from east coast and west coast venture firms and within six different technology industries.

Data from this third study is added to the results from our first two reports to highlight trends from 1980. This information will enable entrepreneurs to develop realistic expectations of the financing process, and forge a strong relationship between those seeking funds and venture firms.

As a result of our analysis, four main conclusions about recent pre-money valuations have been drawn:

Round-to-Round Valuation Growth Lower in This Study

To correct for high valuations during the late eighties, venture capitalists were tougher on valuations in the early nineties. In the face of declining industry performance and substantially reduced commitments to venture capital funds during 1990 and 1991, venture capitalists tightened and toughened pricing. While 1992 commitments increased over 1990 and 1991, the increase in availability of funds has not yet translated into improved pricing for entrepreneurs.

Success in round-to-round financings is achieved when the current pre-money valuation exceeds the post-money valuation from the prior round. Three significant trends emerged from the analysis of round-to-round financings from this study as compared to last:

1. During 1987 to 1989, only 25 percent of the companies had a pre-money valuation less than their prior round's post-money valuation; this increased to 44 percent this study.
2. The percentage of companies receiving a pre-money valuation lower than the last round's pre-money valuation was 28 percent during this study's timeframe, a dramatic increase from the previous study's 4 percent.
3. The growth in value seen by companies able to negotiate their pre-money valuations above the last round post-money valuation was much less dramatic than during 1987 to 1989. This study's average annual growth rate was just 46 percent versus 165 percent for the last study.

The Spread of Valuations Within Each Stage Increases With Later Stage Companies

The unknowns -- unproven business plan and team, yet to be developed technology, undemonstrated market demand -- common in a stage one company, create a tight range of valuations within this stage. As companies move to stage four, and progress toward goals varies, the range of valuations received widens. The valuations received during this timeframe for a stage one company ranged from $500,000 to $4,000,000; with some stage four companies experiencing re-start financings, and others maximizing valuations, average pre-money valuations ranged from minimal amounts to $55,000,000.

Later Stage Companies Receive Higher Pre-Money Valuations

The venture capital industry evaluates companies on their inherent risk. An entrepreneurial team growing their company by achieving objectives reduces the early stage risks identified by the investors. Reducing risk and meeting product development milestones increase the pre-money valuation an entrepreneur can negotiate with a venture capitalist. During the 1990 to 1992 timeframe, an average stage one company received a $2,100,000 pre-money valuation during a round of financing; by stage four this average had increased to $21,100,000.

A Company's Industry Impacts Valuations

Industry group also affects the valuation received. The two industries receiving the highest valuations for each stage of development were biotech and hardware. Although the software industry had strong growth in its development by stage, its pre-money valuations were actually lower than the overall venture capital industry averages.

Why Use This Study

Understanding the relationship between pre-money valuations, proceeds, and post-money valuations is critical for fundraising negotiations. The "Price of Growth" study details the intricacy of these variables and provides guidelines for negotiations. Setting realistic expectations increases the chances of forging a strong, financially rewarding relationship between an entrepreneur and a venture firm.

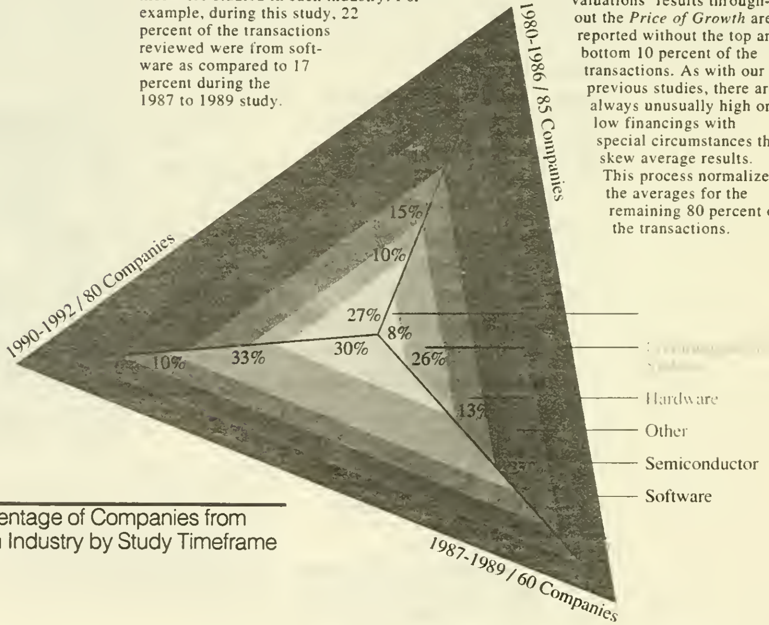
Methodology

We reviewed the financings of 80 technology companies receiving venture capital investments from 1990 to 1992. Companies selected represent six technology industries and spanned four stages of development.

The industry demographics of 1990 to 1992 financings and the previous two studies are displayed below. This pyramid diagrams what proportion of the companies were studied in each industry. For example, during this study, 22 percent of the transactions reviewed were from software as compared to 17 percent during the 1987 to 1989 study.

Data was gathered on individual companies directly from venture capital firms and aggregated for presentation. Venture capitalists were selected to equitably balance representation from east coast and west coast firms. When possible, companies from our two earlier *Price of Growth* studies were tracked to record follow-on rounds of financing.

Pre-money and post-money valuations' results throughout the *Price of Growth* are reported without the top and bottom 10 percent of the transactions. As with our previous studies, there are always unusually high or low financings with special circumstances that skew average results. This process normalizes the averages for the remaining 80 percent of the transactions.



Percentage of Companies from Each Industry by Study Timeframe

III. Venture Industry Definitions

To assist you in understanding venture industry terms, several key definitions are provided.

The Players

The venture capital industry has two groups of key players: venture capitalists and entrepreneurs.

Venture capitalists provide much more than just capital in their role as partners with their portfolio ventures, they also provide their business skills. The experience gained by working as an equity partner in many young ventures allows the venture capital professional to bring invaluable strategic counsel to their portfolio companies. Many of the major strategic events in the life of a high growth venture -- a new product introduction, a major acquisition, an initial public offering -- happen only once or twice in the experience of the average entrepreneurial team. These same events happen many times in the career of the average venture capital general partner, and this experience base is made available to portfolio companies to enhance their growth and value.

The substantial returns on investment generated by the venture capital industry would not be possible without the entrepreneurial teams that create, build and manage companies. Entrepreneurs develop their concepts into technical and marketing strategies, build teams around their ideas, convert their strategies into detailed business plans for growing their ventures, and seek equity capital to finance their plans. Venture capitalists add their capital and business experience to that of the entrepreneurial team, and together they set out to build a major business. This combination of ideas, energy, drive, skills and capital have produced literally thousands of high growth companies that populate the technology industries.

With the capital provided by venture capitalists, according to our "Third Annual Economic Impact of Venture Capital" study, venture-backed companies grew jobs at a compounded average growth rate of 18 percent during 1987 to 1991 while the Fortune 500 declined 2 percent. During that same time, sales of venture-backed companies grew 35 percent versus just 2 percent for the Fortune 500.

Valuation Terms

Understanding the terminology surrounding the valuation process enables entrepreneurs to navigate negotiations.

Post-Money Valuation

Post-money valuation, the valuation term most entrepreneurs are familiar with, is a company's value after cash has been infused into the company. It is the value placed on the venture by the financing transaction.

Proceeds

Proceeds, cash, received during a round of financing should propel a venture to a future point where additional capital can be raised at an increased valuation.

Pre-Money Valuation

The pre-money value of a company is negotiated between entrepreneurs and venture capitalists during a financing round. Venture capitalists evaluate the team's idea, skills, experience, business plan, and progress toward their goals. The pre-money valuation is ascribed to the venture prior to cash being received.

Stage of Development

A company's stage of development heavily impacts the valuation it receives. The length of time a company remains in a stage depends on the company's product and team. At least one round of financing is needed for each stage of development, usually more than one round for later stages. Four stages of development are used to pin-point a venture's growth between a company's initial stages and profit generation.

Stage 1 - Ventures have no product revenues and little expense history. This stage typifies companies with an incomplete team but an idea, business plan, and the beginnings of product development.

Stage 2 - Product development continues, significant expenses are incurred, but no product revenues generated.

Stage 3 - Ventures have product revenue with an operating loss.

Stage 4 - Companies have product revenues and operating profits.

IV. The Valuation Process

The price an entrepreneurial team pays for capital to fund their company's growth is measured by the percentage of equity sold to investors. To understand how this "Price of Growth" is determined, you must first understand the valuation process.

A venture capitalist and entrepreneurial team negotiate the value of the company receiving financing. The total value of the business is defined by the price per share paid multiplied by the total number of shares outstanding after completion of the transaction. This value has been defined as the post-money valuation because it is the value of the venture after cash has been invested. Two critical components, proceeds and pre-money valuation, comprise post-money valuation.

The most evident of these two components is proceeds. The amount invested during a financing round is usually decided after an analysis of the near-term cash requirements. Each round of financing is designed to bring the venture to a future point where significant risks have been reduced and additional capital can be raised at a higher valuation. Most venture capital financings are designed to fund the venture's cash requirements for between twelve and twenty-four months. Financing shorter timeframes requires the entrepreneurial team to spend too much time in the fundraising process. Financing longer time-frames increases the downside risks for the investor by increasing their exposure. For the entrepreneurial team, a long financing timeframe raises too much capital at a lower valuation.

What must be negotiated in the venture capital transaction is the second component, the pre-money valuation -- the value the entrepreneurial team brings to the transaction. This substantially non-cash component includes such assets as: the team's idea, skills, commitment and determination to build the business; the technology and proprietary position; the business plan; and progress to date towards building the business. Pre-money valuations can be calculated either by subtracting the cash invested from the post-money valuation, or by multiplying the price per share paid in the transaction by the number of shares outstanding prior to the financing.

During a financing negotiation, the entrepreneurial team and the venture capitalists focus their discussions on specific points like price per share, post-money valuation, the percentage of the company to be sold or the pre-money valuation. Regardless of which of these points is currently being discussed, what is really being negotiated is the pre-money valuation of the venture.

The pre-money valuation negotiated is relatively independent of the amount of cash to be invested. The relationship between proceeds and pre-money valuation and its effect of the percentage of equity acquired by the venture capitalist are discussed below.

Understanding The Process

Pre-money valuations and proceeds combine to determine the percentage of equity acquired by a venture capitalist:

$$\begin{array}{c}\text{% EQUITY ACQUIRED BY}\\ \text{VENTURE CAPITALIST}\end{array} = \frac{\text{PROCEEDS}}{\text{PRE-MONEY VALUATION + PROCEEDS}}$$

*PRE-MONEY VALUATION + PROCEEDS = POST-MONEY VALUATION

Below are two examples further explaining this relationship.

Examples:

Assumption: A stage two software company trying to raise $2.5 million. In example one, a $2.0 million pre-money valuation has been determined; in example two, the pre-money valuation received is $4.0 million.

Variable	**Example 1**	**Example 2**
Pre-money valuation	$2.0m	$4.0m
Equity calculation	$2.5m/($2.0m + $2.5m)	$2.5/($4.0m + $2.5m)
Equity acquired by venture capitalists	56%	38%
Equity retained by founders	44%	62%
Post-money valuation	$4.5m=$2.5m + $2.0m	$6.5m=$2.5m + $4.0m

Doubling the pre-money valuation from $2.0 million to $4.0 million while holding proceeds constant enables the founders to retain 18 points more equity in the company rather than relinquish this additional interest to the venture capital firm.

The table below calculates the resulting value of the ownership for the founder and venture capitalist.

Variable	**Example 1**	**Example 2**
Value of Venture Capitalist's Ownership	$4.5m * 56% = $2.5m	$6.5m * 38% = $2.5m
Value of Founder's Ownership	$4.5m * 44% = $2.0m	$6.5m * 62% = $4.0m

At the end of example one, the company is valued at $4.5 million, of which the entrepreneurs' portion is 44 percent, or $2.0 million. With the increase in pre-money valuation shown in example two, the entrepreneur now owns 62 percent of a company worth $6.5 million and his or her portion is $4.0 million.

Most entrepreneurs are understandably anxious to estimate what pre-money valuation their company will justify in their next venture capital financing. This determines how much equity they must sell to get the cash for growth they need. Contrary to popular opinion, pre-money valuation is not discovered by mathematical manipulations of the venture's financial projections, particularly in the case of early stage financings. In the absence of meaningful sales and expense data, and tremendous uncertainty about the venture's planned technology development and market penetrations, the venture capitalist looks to more fundamental indicators of value. These are not found on the balance sheet or in projections, but rather in the progress the company has made in reducing key risks that the business faces.

When entrepreneurs show venture capitalists they have reduced their venture's risk, they will increase their pre-money valuation. The risks that professional venture capital investors assess prior to making an investment commitment are detailed in section VII, "Risk Assessments Affecting Pre-Money Valuations."

The next section of the *Price of Growth* reviews hundreds of venture financings and provides guidelines for approximating where in the venture capital market a given venture's valuation fits.

Estimating Pre-Money Valuations

The most important factor determining a company's pre-money valuation is their stage of development. Usually, the earlier the stage, the greater the number and magnitude of unresolved risks facing the business and, thus, the lower the valuation.

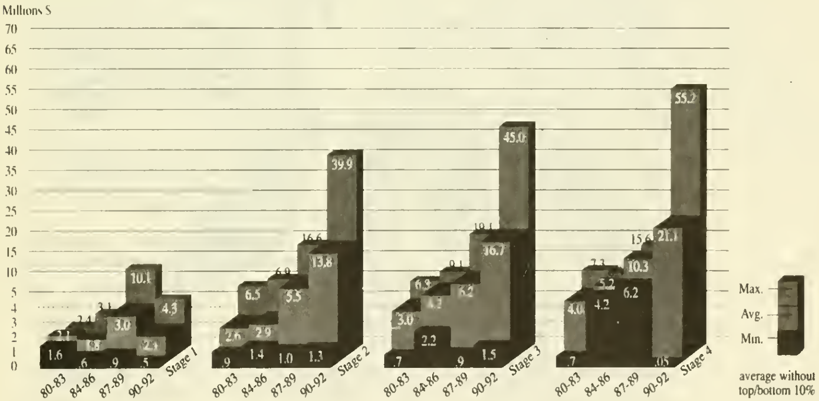
One goal of this publication is to develop realistic pricing expectations for both entrepreneurs and venture capitalists. The graph below tracks pre-money valuations since 1980.

For each stage of development within the four time frames, there are three key data points:

1. The middle teal colored blocks are average pre-money valuations received;
2. The light purple shaded area is the maximum valuation received for that stage and timeframe;
3. The dark purple shade is the minimum valuation received for that stage and timeframe.

Use these data points as references in the pre-money valuation negotiation process. They supply realistic boundaries and averages that can be used to set the stage for discussion. The risk evaluation process determines whether a given venture financing will be placed above or below the average. A company's profile of risks -- team, technology, market opportunity, and business plan -- and how those risks appear to venture capitalists determines how far above or below the average pre-money valuations can be negotiated.

Pre-Money Valuations



V. Pricing Observations

The graph shown on the previous page highlights several important observations.

Observation One: Later stages of development command higher valuations.

Consistent with our two previous studies, the most important factor determining pre-money valuations is the stage of development of the enterprise. The earlier a stage of development and greater the number and magnitude of unresolved risks facing the business, the lower the valuation placed on the venture. As companies reduce significant risks and move to later stages of development, the valuations they can negotiate in the marketplace increase. For the 1990 to 1992 timeframe, stage one companies averaged $2.1 million for pre-money valuations and increased to an average of $13.8 million, $16.7 million and $21.1 million for stage two, three and four companies, respectively.

Observation Two: The spread in valuations widen in later stages of development.

The pre-money valuation graph shows another valuation phenomenon common to all of our *Price of Growth* studies. The range of pre-money valuations broadens overall with each successive stage. Eighty percent of stage one financings in our current study received pre-money valuations between $500,000 and $4 million. For entrepreneurs raising venture capital in today's market, this means that most stage one financings will receive pre-money valuations in this range. It will take an unusually high quality team with an exceptional opportunity to reach the rarefied atmosphere of the top tenth percentile of pre-money valuations.

The tight range for stage one company valuations is a function of the uncertainty facing all ventures so early in life. Common characteristics of these companies are: a partial or emerging team; a less than fully demonstrated technology; undemonstrated market potential; and initial business plan. Some entrepreneurial groups mature into smoothly functioning teams with all the key skills required to match the challenge of the business. Others fail to reduce the critical risks facing their companies and do not raise subsequent rounds of financing at progressively higher valuations.

It is significant to note that while the range of pre-money valuations becomes broader with each successive stage, the bottom of the range in all four stages is still between nominal values and $1 million. Thus in stage four, the group includes successful ventures with valuations over $50 million, as well as re-start financings that are as low or lower than many stage one pre-money valuations.

Observation Three: Although valuations appear to have increased.....

The average pre-money valuations for all stages, except stage one, are higher than our previous two studies. This trend can not be proven statistically, however, because of the size and spread in valuations received. We will continue to track future valuationsand report the results. Valuations widened as a result of the following:

1. There was a shift in stage two companies' pre-money valuations during 1987 to 1989 -- 34 percent of the companies received a pre-money valuation more than $10 million but this increased to 59 percent during 1990 to 1992.
2. A number of stage three and four transactions during 1990 to 1992 received pre-money valuations above $50 million for the first time.

Observation Four: . . . round-to-round valuation increases are down.

Increasing the pre-money valuation of the current round over the post-money valuation of the last round indicates valuation growth. A growth in valuation reflects the progress entrepreneurs have made in reducing risk, and the value placed on this progress by venture capitalists.

Three major points emerged from analyzing round-to-round compounded annual growth rates from this study versus last:

1. More ventures raised money at lower valuations in this study than they did during the last study. Between 1987 and 1989, 25 percent of the round-to-round financings were less than their last round's post-money valuation; however, in 1990 to 1992, 44 percent showed a similar decline. This decrease in valuation is indicative of ventures that have not reduced risks by failing to reach product development goals or to hire a key team member.
2. The number of ventures receiving a pre-money valuation less than the prior round's pre-money valuation was a surprising 28% versus only 4% in the previous study. While the companies in paragraph one above were sliding backwards only slightly, the valuations of the ventures in this group have seriously eroded. This type of financing indicates a risk profile even greater than that seen during the prior financing round.
3. Those companies able to increase their pre-money valuation above the last round's post-money valuation did so at a slower rate. From 1990 to 1992, average annual growth in valuation was 46 percent versus 165 percent for the 1987 to 1989 timeframe. A major factor affecting this decline was the reduction in percentage of companies achieving a valuation growth rate greater than 100 percent. During 1987 to 1989, 38 percent of the companies increased their valuations over 100 percent, versus just 4 percent during 1990 to 1992.

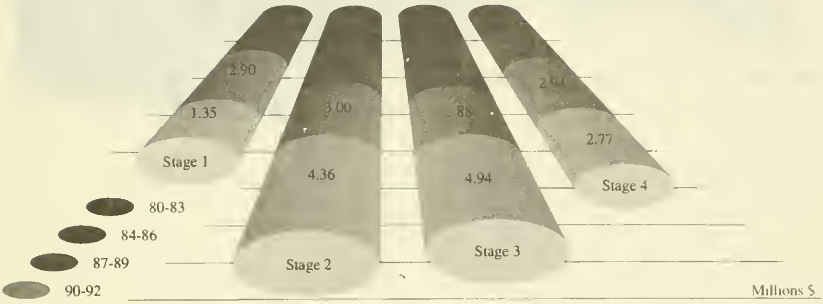
These points clearly indicate a larger number of financings have been completed at much tougher pricing than seen in our last study.

Observation Five: Average proceeds have fluctuated year-to-year in all stages, but remain within a range of $1 million to $5 million.

The graph below shows the average proceeds by stage for all transactions reviewed since 1980.

The average proceeds in stages one and four were lower than stages two and three for two reasons:

1. Stage one companies receive lower average proceeds because they are financed for short timeframes to gauge results.
2. Stage four companies are beginning to rely on other sources of capital as they experience sales and profitability, and reduce their dependence on venture financing.



Observation Six: A company's Industry is another significant variable affecting pre-money valuation.

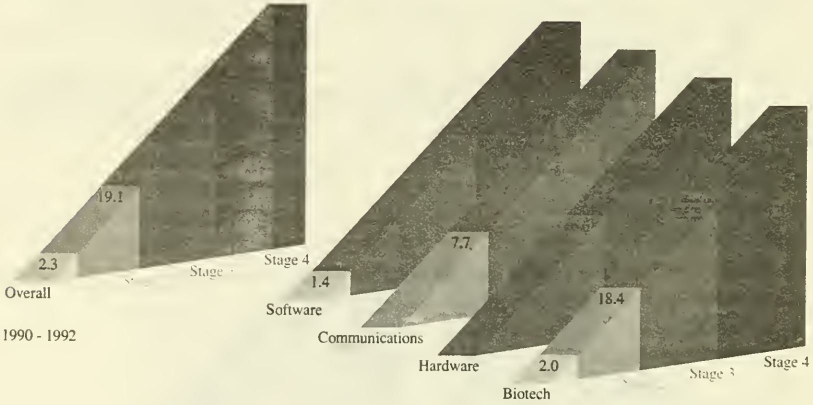
The potential overall profitability an industry can support leads investors to agree to a higher pre-money value for a company in that industry.

Additionally, the cash necessary to support technological development in that area is another factor affecting industry averages. The data shown below depicts biotechnology and hardware as the two industries receiving the highest average valuations as a result of the combined potential for the success in these industries and, extensive capital necesary to fuel growth.

Alternatively, software businesses, on average, commanded lower pre-money valuations for comparable stages of development.

This data on industry averages can be a useful benchmark for entrepreneurs to position their ventures with respect to valuation. It should be used in conjunction with the pre-money valuation graph on page 10 and the risk assessment in Section VII.

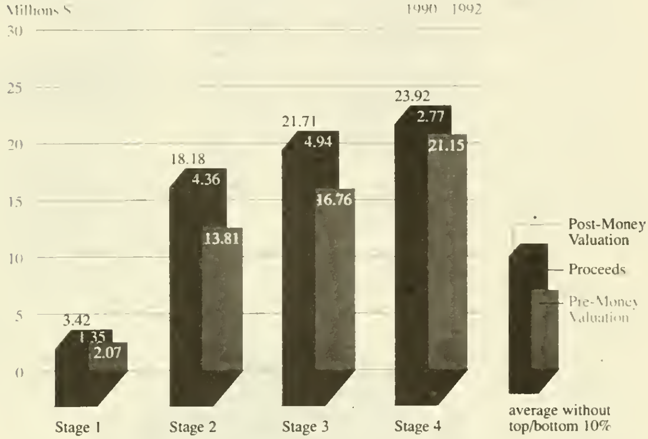
Average Pre-Money Valuations by Industry



Observation Seven: Pre-money valuation drives post-money valuation.

The rise in post-money valuations stage-to-stage parallels the increases in pre-money valuations. It is clear from the chart below that pre-money valuation is the greatest component of post-money determination. As companies successfully advance from stage-to-stage, new investment capital represents a progressively smaller percentage of the total value of that company, and pre-money valuation represents a progressively larger percentage of the total value of the company.

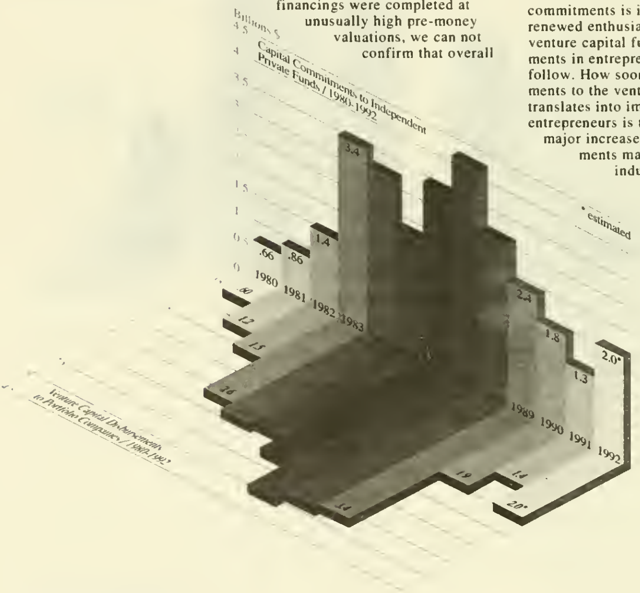
Average Post-Money Valuations



VI. What Do These Observations Mean to Entrepreneurial Teams and Venture Capitalists?

Entrepreneurial teams and venture capitalists are both impacted by changes in pricing reflected in the *Price of Growth's* data. When average pre-money valuations for entrepreneurial teams rise, their price of growth declines. Alternatively, tougher pricing terms to entrepreneurs mean better pricing for venture capitalists, and should translate into improved returns for venture capital funds.

There are several strong indicators of tougher pricing to entrepreneurs in this *Price of Growth* study. Stage one financings recevied lower average pre-money valuations than our 1987 to 1989 study. In stages two through four, round-to-round growth in valuations and the percentage of transactions done at pre-money valuations less than the previous financing's post-money valuations, signal tougher pricing for entrepreneurial ventures. Although a small number of financings were completed at unusually high pre-money valuations, we can not confirm that overall pricing for these stages was significantly higher. As stated, a few transactions in stages two through four were done at very high pre-money valuations. In contrast, a much larger group of financings was completed at valuations that had average annual growth rates lower than those in our 1987 to 1989 study.



Lower pricing offered to entrepreneurial ventures by the venture capital market must be viewed in the context of the overall climate of the venture capital community. 1992 marked the first year since 1987 that fresh commitments to venture capital funds exceeded those of the prior year.

Historically, increases in fresh commitments to the venture capital industry have translated into higher levels of disbursements to portfolio companies, and accordingly, more relaxed pricing to entrepreneurial ventures. If the upturn in fresh commitments is indeed an indicator of renewed enthusiasm for investing in venture capital funds, the level of investments in entrepreneurial ventures should follow. How soon an increase in commitments to the venture capital industry translates into improved pricing for entrepreneurs is the crucial question. If a major increase in returns on the investments made in the venture capital industry is required for venture capital funds to remain an attractive investment vehicle, further corrections in the pricing of later stage deals may still lie ahead.

VI. Conclusions

The *Price of Growth* has displayed how venture capital pricing decisions are tied to both the risks inherent in each venture and the economic climate of the whole venture industry.

Venture teams can, with the help of advisors familiar with the venture capital industry, predict with reasonable accuracy the valuations they can expect during a financing round. These advisors can assist them to mimic the venture capital community's valuation process: gauge the venture's stage of development, and then perform a systematic assessment of key risks to place the venture in the range of values for that stage of development. While the final valuation is a negotiated figure, the bargaining is defined by the underlying value of the business and what the venture capital market is currently paying for ventures with that particular risk profile.

Having realistic expectations about a valuation range for any given year is an important step towards successful fundraising. Venture teams that decide to pursue valuations outside average pricing boundaries begin their fundraising with a serious and potentially fatal drawback. Venture teams must remember that the question of valuation is not a single event in the life of the venture, but rather an issue that will be addressed in three to six rounds of financing as the venture progresses from start-up through development and into the marketplace.

The entrepreneur's objective in venture capital fundraising is to optimize the balance between the sale of equity with the venture's requirements for cash. Maximizing the price paid by investors in any given round should not be the primary concern of the venture team; maximizing the price paid by equity partners over the life of the venture is the more correct perspective.

In the first few rounds of venture capital fundraising, selecting and recruiting the best venture capital partner possible is more important than just the price paid. The highest quality venture capital firm in the venture's local market will usually not be the player offering the highest pre-money valuation for a round of financing. But recruiting the higher quality venture capital partners early will make subsequent rounds of financing substantially easier to effect, and will make available to the venture a broad range of value-added assistance.

When successful ventures review the numerous rounds of financing pre-empting an IPO or a merger/acquisition, maximizing the quality of their venture capital partners is usually preferable to maximizing the price per share in each round. The reason is simple: ventures get much more than just capital when they pick the right venture capital partners and the total price of growth must be measured by more than one round's valuation.

Entrepreneurs cannot do much about the prevailing venture capital market, but they can do a great deal about the quality and extent of their progress in reducing risks. The best way to optimize the venture's pre-money valuation and the sale of precious equity throughout the life of the venture is to reduce key risks using the minimum outside capital necessary. Like the equity rewards of growth ventures, this challenge is shared by both entrepreneurial teams and the venture capital firms that back them.

VII. Risk Assessments Affecting Pre-Money Valuations

Valuation is a function of the profile of risks that a venture faces at any point in time. High growth ventures enhance their value as they reduce or eliminate key risks or uncertainties that lie in their future. Professional venture capitalists approach the valuation by assessing these key risks in detail during the due diligence process.

Team Risk

- What are the quality and horsepower of the management team?
- Is the team complete?
- Does it have the best skills available for the business plan proposed?
- Have the team members worked well as a team before?
- Can they implement their proposed business plan?
- What has their performance been to date?
- Has the CEO successfully started and operated a similar company before?

Business Strategy Risk

- What are the quality and scale of the business opportunity, plan, strategy and tactics?
- Is the size of a success in this market sufficiently exciting?
- Have a pragmatic business plan and strategy been developed for success in this market?

Product/Technology Risk

- Are planned technical advances achievable?
- Does the plan require significant technological advances before the product can be finalized?
- Is the product development effort contingent on outsiders' technology advances?

Market Risk

- Has market need been conclusively demonstarted?
- How large is the market and how fast is it growing?
- Can the characteristics of the market be readily assessed?
- Is market accessibility known?
- How structurally suited is this market to the proposed business strategy?
- Will the market support the growth rates and pricing levels required by the plan?

Operations Risk

- Will this be a complex and difficult business to run and control?
- Does the team have the necessary skills to operate this business?

Financial Risk

- How much capital will it take to properly develop this business?
- How valuable will this venture be if it achieves its business plan?
- How long will it take to achieve that value?
- How will the venture capital investors exit the investment with liquid returns?

Venture capitalists scrutinize these risks during the due diligence process, spending the most time in due diligence on those risks that loom largest in the future of the venture. Generally the largest portion of due diligence resources is spent on assessment of the team risk, with technology and market risk assessments following closely behind. The results of these risk assessments ultimately must be quantified in a single decision about the current value of the business as it stands prior to financing -- the pre-money valuation -- if the deal proceeds.

VIII. How Coopers & Lybrand Can Help The Venture Capital Process

Coopers & Lybrand is an experienced ally of the venture capital and entrepreneurial communities. We are proud to count as our clients more venture capital firms than any other public accounting and consulting firm. We demonstrate our commitment and expertise through services and products tailored to the needs of both entrepreneurs and venture capitalists:

- ▲ We have established a National Venture Capital Group to help entrepreneurs secure financing and to provide high quality, consistent services to venture capital clients.
- ▲ We exclusively license the Bell/Mason Diagnostic, an expert system developed by C. Gordon Bell and Heidi Mason in collaboration with Coopers & Lybrand to evaluate risk in emerging technology companies. This diagnostic can be a critical aid in fundraising efforts.
- ▲ We produce other monographs offering insights into the process of raising capital:
  - ⇨ *Three Keys to Obtaining Venture Capital*
  - ⇨ *Charting a Course for Corporate Venture Capital*
  - ⇨ *What Do Venture Capitalists Think About Biotechnology?*
  - ⇨ *Annual Economic Impact of Venture Capital*

If you have questions or would like advice in business planning, structuring, pricing or negotiating your venture capital financings, please call the High Technology or Venture Capital Partner in the Coopers & Lybrand office nearest you (see listing on next page) or call the Coopers & Lybrand High Tech Hotline: 617/574-5292.

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Three Keys to Obtaining Venture Capital

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Three Keys to Obtaining Venture Capital

A Message to Entrepreneurs

Three Keys to Obtaining Venture Capital is designed to help first-time entrepreneurs understand the venture capital process and provides a useful step-by-step tool for creating a business plan. Through this understanding, and armed with a comprehensive and thorough business plan, an entrepreneur will have realistic expectations and can concentrate on targeting the financing search for the most promising investment sources.

Coopers & Lybrand is experienced in reviewing business plans and financial forecasts. We will help you make contacts and maintain good working relationships with venture capitalists. Through our High Tech Network and Venture Capital Network, over 1,000 professionals will work with you to target appropriate funds and provide introductions. Coopers & Lybrand provides accounting, auditing, tax and consulting value-added services to emerging and mature technology companies.

We would like to thank Larry Buchsbaum of our National High Tech Group for leading the effort to update this study. Several others provided substantive assistance; our thanks to Bob Stavers, Pete Collins, Scott Lewis, Brian Goncher, Mike Iannuccillo, Dan Roach, Jim Vahey and Ann Marie Rosa. We also wish to thank Jack Hayes of Biohybrid Technologies, Inc., and Paul Kelley and Gordon Baty of Zero Stage Capital for their assistance.

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Introduction to the Three Keys

I. Understand the Process

To an entrepreneur seeking venture capital financing for the first time, an understanding of the venture capital process is essential. The venture capital industry includes many firms with substantial funds to invest; however, it is often a challenge for an entrepreneur to tap into this vital source of financing. This booklet is designed to ease the challenge by providing insights into obtaining venture capital financing.

The venture capital process begins with an introduction to a venture capitalist. Cold calling on venture capitalists is a long shot — venture capitalists see many "over the transom" deals, very few of which become investments. Introductions to venture capitalists through referral sources they respect improve the odds of securing financing. Coopers & Lybrand, with a leading position in serving the venture capital community, has this respect.

Target a Venture Capital Partner

Choosing the right venture capital firms is an important part of the fund-raising process. An entrepreneur that has not researched and targeted venture firms runs the risk of lengthening the search and "overshopping" the plan. Venture capitalists readily exchange information, so rejection from one firm may influence others.

The criteria for selecting the right venture capitalists to approach include their geographic, industry specialization, stage of development and size of investment preferences. Also important are whether the fund will act as a lead investor and whether there are complementary or competing investee ventures within the fund's portfolio.

The research of a fund's preferences can be done by obtaining literature from the funds directly, talking to venture-backed entrepreneurs and consulting with Coopers & Lybrand, a leading service provider active in the venture community.

II. Write the Business Plan

Often the first step in dealing with venture capitalists is to forward them a copy of the business plan. And, because venture capitalists have to deal with so many business plans, the plan must immediately grab the reader's attention. The executive summary will either entice venture capitalists to read the entire proposal or convince them not to invest further time.

A good plan is crucial for two reasons: first, as a management tool, and second, as a means to obtain financing. While the plan is an essential element in securing financing, it should also be an operating guide to the business, with the goals, objectives, milestones and strategies clearly defined and well written. This is the best way to demonstrate the viability and growth potential of the business and to showcase the entrepreneur's knowledge and understanding of what is needed to meet the company's objectives. The first reading of a plan is the venture capitalist's initial opportunity to evaluate the individuals who will manage the business and to measure the potential for return on this investment.

The plan should also address the following business issues from the perspective of the venture capitalist:

- Is the management team capable of growing the business rapidly and successfully?
- Have they done it before?
- Is the technology fully developed?
- Is the product unique, and what value does it create so that buyers will want to purchase the product or service?
- Is the market potential large enough?
- Does the team understand how to penetrate the market?
- Do significant barriers to entry exist?
- How much money is required and how will it be utilized?
- What exit strategies are possible?

If the plan is of interest, the entrepreneur will be contacted for the first of what will generally be several meetings, and the venture capitalist may begin the due diligence process. Since venture firms are in the business of making risk investments, one can be certain a thorough analysis of the company's business prospects, management team, industry and financial forecasts will precede any investment.

Prepare for the Negotiation Process

Following due diligence, the successful venture will then enter into the negotiation process, where the structure and terms of financing will be determined. The entrepreneur must carefully prepare for this next step by becoming familiar with the various structures of venture capital financing and preparing a bargaining position after consulting with an attorney who has extensive venture capital experience. Attorneys will give guidance on the issues worth fighting for. Issues to consider are: vesting, salary, stock restrictions, commitment to the venture, debt conversion, dilution protection, downstream liquidity and directors. The negotiation will involve most or all of these issues in addition to price per share. However, price-per-share concerns should not be the overriding interest; the end result of this process must be a win/win situation in order for the relationship to progress successfully. The last step is to document and close the transaction, resulting in a term sheet, investment agreement(s) and, finally, the closing.

III. Prepare the Financials

Realistic financial forecasts within the business plan are important to attract investors and retain their interest to participate in future rounds of financing. The financials must accurately reflect the various product development, marketing and manufacturing strategies described in each section of the plan.

The First Key: Understanding the Process

1. Profile of a Typical Venture Capital Fund

Professionally managed venture capital funds provide seed, start-up and expansion financing as well as management/leveraged buyout financing. In addition to these distinctions, funds may also specialize in technology sectors such as biotechnology, while others invest in a wide array of technology and nontechnology arenas.

Venture capital firms are typically established as partnerships that invest the money of their limited partners. The limiteds are usually corporate pension funds, governments, private individuals, foreign investors, corporations, insurance companies, endowment funds and even other venture capital funds. When venture capital firms raise money from these sources, they group the money committed into a fund. A typical fund might close at $35-$120 million and actively invest for three to five years. Since investors in venture capital funds have specific return-on-investment requirements, a venture capitalist must evaluate potential investments with a similar return-on-investment consideration.

Since the return on investment is critical, venture capitalists invest with certain criteria in mind. Many funds invest between $2-$3 million in any one venture over a three- to five-year period and look for companies with market potential of $50-$100 million. Since a venture fund typically invests in only 20-30 companies, each investment must be screened carefully. Venture capitalists will be looking for a 30%-40%, or more, annual return on investment and for total return of 5 to 20 times their investment.

Venture capitalists are not passive investors and become involved as advisors to management, usually as members of the company's board of directors. By actively participating in investments, venture capitalists seek to maximize their return.

Just as venture capitalists perform due diligence, an entrepreneur must evaluate the benefits that a particular venture firm can provide the company.

- Do the venture capitalists have experience with similar types of investments?
- Do they take a highly active or passive management role?
- Are there competing companies in their portfolio?
- Are the personalities on both sides of the table compatible?
- Does the firm have strong syndication ties with other venture firms for additional rounds of financing?
- Can they help provide contacts for distribution channels and executive search?

2. The Valuation Process

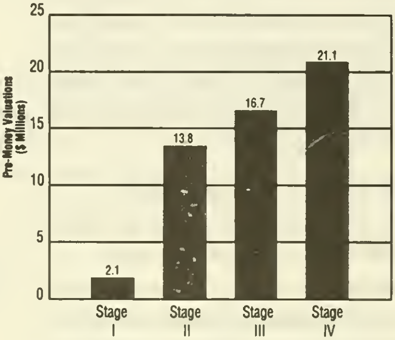
It is critical for an entrepreneur seeking venture capital to assess the value of the company from the perspective of the venture capitalist and to appreciate the dynamics of the entrepreneur/venture capitalist relationship. This relationship revolves around a trade-off. Funds for growth are exchanged for a share of ownership. The entrepreneur will be asked to give up a large share of ownership of the company, possibly a majority stake. The venture capitalist seeks to value the venture to provide a return on investment commensurate with the risk taken.

Entrepreneurs seek to raise as much money as they can while giving up as little ownership as possible. Venture capitalists strive to maximize their return on investment by putting in as little money as possible for the largest share of ownership. Through the negotiation process, the two parties come to agreement. Entrepreneurs understand that excess funding costs them equity. Venture capitalists must leave company founders with enough ownership to provide incentive to make the business succeed. To balance their individual goals, both parties should agree on one mutual goal—to grow a successful enterprise.

The first step in the negotiation process is to determine the current value of the company. The most important factor in determining this "pre-money valuation," or the value of the venture prior to funding, is the stage of development of the company. A business with no product revenues, little expense history and an incomplete management team will usually receive a lower valuation than a company with revenue that is operating at a loss. This is because the absence of one or more of these elements increases the risk of the venture's not succeeding. Each successive stage commands higher valuations as the business achieves milestones, confirms the ability of the management team, and progresses in reducing fundamental risks. Another Coopers & Lybrand study, *Venture Capital: The Price of Growth, 1993 Update*, clearly shows the rise in valuations as companies become more fully developed and move through the stages of growth.

Exhibit 1
Valuations Rise as Value Grows

All Rounds of Financing 1990-1992*



Venture Capital: The Price of Growth, 1993 Update

Stage I
Ventures have no product revenues to date and little or no expense history, usually indicating an incomplete team with an idea, plan and possibly some initial product development.

Stage II
Ventures still have no product revenues, but some expense history suggesting product development is under way.

Stage III
Ventures show product revenues, but they are still operating at a loss.

Stage IV
Companies have product revenues and are operating profitably.

*Average pre-money valuations for all rounds in Exhibit 1 are dependent on a company's reduction of business risks.

The best way to build value in a company is to achieve the goals and milestones within the timeframes designated in the business plan. As milestones are achieved, risk is reduced and subsequent rounds of financing can usually be raised at more attractive valuations. Many entrepreneurs "bootstrap" themselves during the early stages to achieve high valuations later on. This early money can come from the founders, family and friends, private investors, or money-raising strategies such as consulting or custom development.

Pricing and Control: The Investors' Perspective

Pricing venture capital deals involves the estimated future values of the entity being financed and is highly subjective.

Theoretical approaches can be used to estimate the company's future value and the corresponding percentage ownership that the investor requires—in other words, estimated future value based on the venture's expected profitability and estimated earnings multiples. The estimated percentage ownership the investor must receive can then be calculated to derive the desired return on investment.

As noted, venture capital investors expect an annual rate of return of 30% to 40% or more. Exhibit 2 shows the percentage investment a venture capitalist would need to realize to support a 30% return on investment at various estimated market values. As shown, to realize a 30% return on an investment of $4 million, a venture capitalist would need to own 32% of a company with an estimated future market value of $60 million after six years. If the estimated future market value is higher, $100 million for example, a smaller percentage ownership (19%) will provide the required rate of return.

Exhibit 2
Ownership Required to Support a 30% Return

		Estimated Future Market Value of a Company in Six Years (In millions of $)				
		$20	$40	$60	$80	$100
Millions of Dollars Invested	2	48%	24%	16%	12%	10%
	4	96%	48%	32%	24%	19%
	6	N/A	72%	48%	36%	29%
	8	N/A	96%	64%	48%	38%
	10	N/A	N/A	80%	60%	48%

N/A = Investment would not be made if the present value of the company's estimated future market value is less than the investment requested.

The Second Key: Writing the Business Plan

1. Why Is a Business Plan Needed?

A quality business plan is an important first step in convincing investors that the management team has the experience to build a successful enterprise. The plan also provides measurable operating and financial objectives for management and potential investors to measure the company's progress.

2. Executive Summary

Business plans should be summarized into a short two- to three-page synopsis called the executive summary. The summary is used to capture the essence of the plan and generate interest so the reader further studies the full proposal. It is the most important section of the business plan and should be written last, ensuring that only vital information is included.

At many of the largest venture capital firms, fewer than 5% of the hundreds of plans received are reviewed beyond the executive summary. While sometimes this is because the business does not fit the type of investment favored by that firm, more often it is because the executive summary is not written convincingly or clearly enough. The summary must stand out and be noticed, and to do this it must be of the highest quality. The summary must be persuasive in conveying the company's growth and profit potential and management's prior relevant experience.

The effort taken in researching investor preferences and preparing a quality summary will set the plan apart and assure that it receives further consideration by venture capital firms.

3. Executive Summary Outline

a. Company Overview

Generally, the investor wants to know—in a hurry—what product the company is developing, the market/industry it serves, a brief history, milestones completed (with dates) and a statement on the company's future plans. If the company is an ongoing business seeking expansion capital, the entrepreneur must summarize the company's financial and market performance to date.

b. Management Team

List the key members of the management team and technical advisors, including their age, qualifications and work history. It is important to emphasize the team's relevant, proven track record. Note key open positions and how you intend to fill them.

c. Products and Services

Provide a short description of the product or service and highlight why it is unique. Discuss any barriers to entry that prevent further competition (e.g., patents). Mention the product's direct or indirect competition. If possible, briefly mention future product development plans such as upgrades or product line extensions in order to show the investor that the venture is not a one-product company.

d. Market Analysis

Define the target market to be served using recent market data and analysts' estimates of current and projected size and growth rates. Also note what percent of the market the company plans to capture. Mention the names of your largest current, well-known customers who have either purchased your product or given you letters of intent. It is important to discuss who will buy the product and why. Briefly note the distribution/selling strategies used in the industry and explain which one(s) you plan to use to penetrate the market.

e. Funds Requested and Uses

State the amount of money required and be specific in the description of the uses of the funds sought. Avoid such general terms as "working capital."

f. Summary of Five-Year Financial Projections

This section should summarize key financial projections through breakeven. Only projected revenues, net income, assets and liabilities should be listed. It is also useful to note additional expected rounds of financing needed.

Body of the Plan

1. Company Overview

In this section one should fully describe the reason for founding the company and the general nature of the business. The investor must be convinced of the uniqueness of the business and gain a clear idea of the market in which the company will compete.

The entrepreneur's vision for the company's future production and operations strategy should also be described. An investor needs to be assured that the company is built around more than a product idea. The entrepreneur needs to demonstrate that a profitable business can be built based on the strategies detailed in the plan.

2. Products and Services

The business plan must convey to the reader that the company and product truly fill an unmet need in the marketplace. The characteristics that set the product and company apart from the competition need to be defined. It is also important to describe each of the end-user segments that will be targeted. A full profile of the end users and the key potential applications of the product will demonstrate to an investor that the entrepreneur has done his/her marketing homework.

A description of the status of patents, copyrights and trade secrets is very important. It is equally imperative to describe barriers to entry. Keep in mind that patents are only as good as they are defensible.

The plan should list all the major product accomplishments achieved to date as well as remaining milestones. This will give an investor a comfort level, knowing that the entrepreneur has tackled several hurdles and is aware of remaining hurdles and how to surmount them. Specific mention should be made of the results of alpha (internal) and beta (external with potential customers) product testing. If alpha or beta tests are upcoming, mention how these tests will be conducted.

Single product companies can be a concern for investors. It is always beneficial to include ideas and plans for future products. If the plan demonstrates the viability of several products, an investor will see an opportunity to grow a successful business.

3. Market Analysis

The analysis of market potential separates the inventors from entrepreneurs. Many good products are never successfully commercialized because their inventors don't stop to understand the market or assemble the management team necessary to capitalize on the opportunity.

This section of the business plan will be scrutinized carefully; market analysis should therefore be as specific as possible, focusing on believable, verifiable data. **Market Research** should contain a thorough analysis of the company's industry and potential customers. **Industry Data** should include growth rates, size of the market, recent technical advances, government regulations and future trends. **Customer Research** should include the number of potential customers, the purchase rate per customer, and a profile of the decision-maker. This research drives the sales forecast and pricing strategy, which relates to all other strategies in marketing, sales and distribution. Finally, comment on the percentage of the target market the company plans to capture.

4. Management and Ownership

Venture capitalists invest in people—people who have run or who are likely to run successful operations. Potential investors will look closely at the members of the company's management team. The team should have experience and talents in the key disciplines: technological development, marketing, sales, manufacturing and finance. This section of the plan should therefore introduce the members of your management team and what they bring to the business. Detailed resumes should be included in an appendix.

The management team in most start-up companies includes only a few founders with varied backgrounds and an idea. If there are gaps in the team it is important to mention them and comment on how the positions will be filled. Glossing over a key unfilled position will raise red flags. Often, because venture capital investors have access to networks of management talent, they can provide a list of proven candidates appropriate for these crucial positions.

Include a list of the board of directors or advisors: key outside industry or technology experts who lend guidance and credibility. This is another area where empty positions may be filled from suggestions of a well-networked investor.

5. Marketing Plan

The primary purpose of the marketing section of a business plan is to convince the venture capitalist that the market can be developed and penetrated. The sales projections made in the marketing section will drive the rest of the business plan by estimating the rate of growth of operations and the financing required. The plan should include an outline of plans for

- Pricing,
- Distribution channels, and
- Promotion.

Pricing:

The strategy used to price a product or service provides an investor with insight for evaluating the strategic plan. Explain the key components of the pricing decision, i.e., image, competitive issues, gross margins and the discount structure for each distribution channel. Pricing strategy should also involve consideration of future product releases and future products.

Distribution Channels:

A manufacturer's business plan should clearly identify the distribution channels that will get the product to the end user. For a service provider, the distribution channels are not as important as are the means of promotion. Distribution options for a manufacturer may include:

- Direct Sales - such as mail order, direct contact through salespeople and telemarketing;
- Original Equipment Manufacturers (OEM) - integration of the product into other manufacturers' products;
- Distributors or Wholesalers; or
- Retailers.

Each of these methods has its own advantages and disadvantages and financial impact, and these should be clarified in the business plan. For example, assume the company decided to use direct sales because of the expertise required in selling the product. A direct salesforce increases control, but it requires a significant investment. A venture capitalist will look to the entrepreneur's expertise as a salesperson, or to the plans to hire, train and compensate an expert salesforce. If more than one distribution channel is used, they should all be compatible. For example, using both direct sales and wholesalers can create channel conflict if not managed well.

Fully explain the reasons for selecting these distribution approaches, and the financial benefits they will provide. The explanation should include a schedule of projected prices, with appropriate discounts and commissions as part of the projected sales estimates. These estimates of profit margin and pricing policy will provide support for the decision.

Promotion:

The marketing promotion section of the business plan should include plans for product sheets, potential advertising plans, trade show schedules and any other promotional materials. The venture capitalist must be convinced that the company has the expertise to move the product to market. A well-thought-out promotional approach will set the business plan apart from the competition.

It is important to explain the thought process behind the selected sources of promotion and the reasons for those not selected.

6. Competition

A discussion of the competition is an essential part of the business plan. Every product or service has competition; even if the company is first-to-market, the entrepreneur must explain how the market's need is currently being met and how the new product will compete against the existing solution. The venture capitalist will be looking to see how and why the firm will beat the competition. The business plan should analyze the competition, giving strengths and weaknesses relative to the product. Attempt to anticipate competitive response to the product. Include, if possible, a direct product comparison based on price, quality, warranties, product updates, features, distribution strategies and other means of comparison. Document the sources used in the analysis.

7. Operations

The operations section of the business plan should discuss the location and size of the facility. If one location is selected over another, be sure to include justification. Factors such as the availability of labor, accessibility of materials, proximity to distribution channels and tax considerations should be mentioned. Describe the equipment and the facilities. If more equipment is required in response to production demands, include plans for financing. If the company needs international distribution, mention whether the operations facility will provide adequate support. If work will be outsourced to subcontractors, eliminating the need to expand facilities, state that, too. The investor will be looking to see if there are inconsistencies in the business plan.

If a prototype has not been developed or there is other uncertainty concerning production, include a budget and timetable for product development. The venture capitalist will be looking to see how flexible and efficient the facility plans are. The venture capitalist will also ask such questions as:

- If sales projections predict a growth rate of 25% per year, does the current site allow for expansion?
- Are there suppliers who can provide the materials required?
- Is there an educated labor force in the area?

These and any other factors that might be important to the investor should be included. The sales projections will determine the size of the operation and thereby the funds required both now and in the future. Include the sources and uses of financing in the business plan, and be certain the assumptions are realistic. The timing and the amount of funds will be derived from the sales estimates.

Business Plan DOs and DON'Ts

- DO be brief. Begin with a two- to three-page executive summary. Then, limit the body of the plan to seven-to-ten typewritten pages. Note that internal business plans and budgets are normally more detailed than those presented to external investors. Include everything important to the business and financing decision, but leave secondary issues and information, such as detailed financial information, for discussion at a later meeting.
- DO let the reader know, early on, what type of business the company is in. While this may seem obvious, many plans tell the reader this information on page 20, for example, and with other plans, the reader is never certain.
- DO state the company's objectives.
- DO describe the strategy and tactics that will enable the company to reach those objectives.
- DO cite clearly how much money the company will need, over what period of time and how the funds will be used.
- DO have a clear and logical explanation about the investor's exit strategy.
- DON'T use highly technical descriptions of products, processes and operations. Use common terms. Keep it simple and complete.
- DO be realistic in making estimates and assessing market and other potentials.
- DO discuss the company's business risks. Credibility can be seriously damaged if existing risks and problems are discovered by outside parties.
- DON'T make vague or unsubstantiated statements. For example, don't just say that sales will double in the next two years or that new product lines will be added without supporting details.
- DO be specific. Substantiate statements with underlying data and market information.
- DO summarize and properly structure internal budgets and plans to facilitate review by outside parties.
- DO enclose the proposal/business plan in an attractive but not overdone cover.
- DO provide extra copies of the plan to speed the review process.

The Third Key: Preparing the Financials

1. The Purpose of Financial Forecasts

Developing a detailed set of financial forecasts demonstrates to the investor that the entrepreneur has thought out the financial implications of the company's growth plans. Good financial forecasts integrate the performance goals outlined in the plan into financial goals so that return on investment, profitability and cash-flow milestones can be clearly stated. Investors use these forecasts to determine if (a) the company offers enough growth potential to deliver the type of return on investment that the investor is seeking, and (b) the projections are realistic enough to give the company a reasonable chance of attaining them.

2. Content of Financial Forecasts

Investors expect to see a full set of cohesive financial statements, including a balance sheet, income statement and cash-flows statement, for a period of three to five years. It is customary to show monthly statements until the breakeven point or profitability is reached. Thereafter, quarterly statements should be prepared for two years, followed by yearly data for the remaining timeframe. It is also imperative that the forecasts include a footnote section that explains the major assumptions used to develop revenue and expense items. It is not advisable to "ramp up" sales and expenses in sequential fashion—this gives the impression that the financial implications of the plan have not been fully thought out. Prepare the financial projections as the final step in putting together the plan.

The following section contains some helpful hints on how to develop sound assumptions from which to base projections.

3. Assumptions to Use in Forecasts

a. Sales

Preparing the sales forecasts can be a difficult process, especially in a developing or niche market. Typically, the plan should state an average selling price per unit along with the projected number of units to be sold each reporting period. Sales prices should be competitive with similar offerings in the market and should take into consideration the cost to produce and distribute the product.

b. Cost of Sales

Investors will expect accurate unit cost data, taking into consideration the labor, material and overhead costs to produce each unit. Have a good grasp on initial product costing so it is protected against price pressure from competitors. This data will also be important for strategic "make versus buy" decisions.

c. Product Development

Product development expenses should be closely tied to product introduction timetables elsewhere in the plan. These expenses are typically higher in the early years and taper off because product line extensions are less costly to develop. Investors will focus on these assumptions because further rounds of financing may be needed if major products are not introduced on time. Also, many investors will not finance a company that does not already have a saleable product whose profits can be reinvested in the development of new products.

d. Other Expenses

A detailed set of expense assumptions should take into consideration headcount, selling and administrative costs, space and major promotions. It is useful to compare final expense projections with industry norms. All expense categories should be considered.

e. Balance Sheet

The balance sheet should agree with the income and cash-flows statement. Consideration should be given to the level of inventory and capital expenditures required to support the projected sales level. It is important to limit capital expenditures at the outset to current requirements because cash will be harder to come by if fiscal restraint is not demonstrated to investors. It is generally better to rent or lease capital equipment in the first few years in order to conserve cash for marketing and selling expenses that will generate sales.

f. Cash Flows

The cash-flows statement must correlate to the balance sheet and income statement and should mirror the timing of the funding requirements stated in the plan. Investors will study the cash-flows statement to determine when cash-flow breakeven is expected and when periodic needs are anticipated. Venture capital firms set aside a certain percentage of their funds for follow-on financing to address these periods of need by their portfolio companies, but the cost in lower valuations for unanticipated financings can be high. This is why it is important to set realistic forecasts so that the initial request covers the capital needs until the business can complete milestones leading to higher valuations in future rounds.

4. Examples of Financial Forecasts

The financial forecasts illustrated on the next page represent a fast-growth, technology-oriented manufacturing company. The forecasts are shown on a yearly basis. An actual business plan, however, should show monthly figures until breakeven and then quarterly statements for subsequent years. The assumptions are included as a guide and may not apply to all start-up companies. Be sure to consult your financial advisor.

FAST TRACK, Inc.

Income Statement (000s omitted)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Product Sales	$ 1,197	$3,699	$7,500	$16,685	$37,349
Service Revenue	81	572	1,509	2,499	3,934
Total Revenue	1,278	4,271	9,009	19,184	41,283
COST OF SALES					
Direct Materials	474	995	2,434	4,532	11,674
Overhead	164	705	900	1,860	2,708
Service Cost	41	286	755	1,250	1,967
Total Cost of Sales	679	1,986	4,089	7,642	16,349
Gross Margin	599	2,285	4,920	11,542	24,934
OPERATING EXPENSES					
Engineering	270	462	618	1,158	1,958
Marketing/Sales	351	829	1,605	3,109	5,968
Administration	1,465	1,660	2,154	2,805	4,179
Total Operating Expense	2,086	2,951	4,377	7,072	12,105
Income Before Int. and Tax	(1,487)	(666)	543	4,470	12,829
Interest Expense	0	0	0	0	0
Interest Income	33	21	44	118	340
Income (loss) Before Taxes	(1,454)	(645)	587	4,588	13,169
Tax Expense	0	0	0	1,231	5,268
Net Income (loss)	$(1,454)	$(645)	$ 587	$ 3,357	$ 7,901

FAST TRACK, Inc.

Balance Sheet (000s omitted)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
ASSETS					
Current Assets					
Cash	$ 365	$ 657	$ 548	$ 363	$ 2,332
Accounts Receivable, Net	256	1,452	2,152	5,522	10,991
Inventory	211	909	1,312	2,775	6,753
Total Current Assets	**832**	**3,018**	**4,012**	**8,660**	**20,076**
Property, Plant and Equipment	64	137	248	430	690
Less Accumulated Depreciation	14	50	115	215	366
Net Property, Plant and Equipment	**50**	**87**	**133**	**215**	**324**
Other Long-Term Assets					
Organization Costs	5	5	5	0	0
Less Accumulated Amortization	2	4	5	0	0
Total Other Long-Term Assets	**3**	**1**	**0**	**0**	**0**
Total Assets	**$ 885**	**$3,106**	**$4,145**	**$8,875**	**$20,400**
LIABILITIES					
Short-Term Liabilities					
Accounts Payable	114	282	473	999	2,609
Accrued Expense	191	329	503	848	1,398
Salaries Payable	10	20	31	42	83
Taxes Payable	0	0	0	308	1,317
Total Short-Term Liabilities	**315**	**631**	**1,007**	**2,197**	**5,407**
Long-Term Liabilities					
Long-Term Debt	0	0	0	0	0
Reserve for Warranty	24	74	150	333	747
Total Long-Term Liabilities	**24**	**74**	**150**	**333**	**747**
Total Liabilities	**339**	**705**	**1,157**	**2,530**	**6,154**
EQUITY					
Common Stock	500	500	500	500	500
Preferred Stock	1,500	4,000	4,000	4,000	4,000
Retained Earnings	(1,454)	(2,099)	(1,512)	1,845	9,746
Total Equity	**546**	**2,401**	**2,988**	**6,345**	**14,246**
Liabilities and Equity	**$ 885**	**$3,106**	**$4,145**	**$8,875**	**$20,400**

FAST TRACK, Inc.

Statement of Cash Flows (000s omitted)

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Cash Flows From Operating Activities					
Net Income (loss)	$(1,454)	$(645)	$587	$3,357	$7,901
Add: items not requiring cash in the current period					
Depreciation/Amortization	16	38	66	100	151
Changes in Operating Assets and Liabilities					
Accounts Receivable	(256)	(1,196)	(700)	(3,370)	(5,469)
Inventory	(211)	(698)	(403)	(1,463)	(3,978)
Accounts Payable	114	168	191	526	1,610
Accrued Expense	191	138	174	345	550
Salaries Payable	10	10	11	11	41
Taxes Payable	0	0	0	308	1,009
Reserve for Warranty	24	50	76	183	414
Other Long-Term Assets	(5)	0	0	0	0
Net Cash Provided by (used in) Operating Activities	(1,571)	(2,135)	2	(3)	2,229
Cash Flows From Investing Activities					
Capital Expenditures	(64)	(73)	(111)	(182)	(260)
Net Cash Used in investing Activities	**(64)**	**(73)**	**(111)**	**(182)**	**(260)**
Cash Flows From Financing					
Equity Investment	2,000	2,500	0	0	0
Net Cash Provided by Financing Activities	**2,000**	**2,500**	**0**	**0**	**0**
Change in Cash	**365**	**292**	**(109)**	**(185)**	**1,969**
Cash, Beginning of Year	0	365	657	548	363
Cash, End of Year	**$ 365**	**$ 657**	**$ 548**	**$ 363**	**$ 2,332**

FAST TRACK, Inc.

Summary of Forecast Assumptions

5. Summary of Financial Assumptions

This footnote section will summarize the assumptions developed in Section 3. It should highlight key points of the plan that relate to cash flows and requirements for funds, as well as assumptions used to develop the forecasts.

Sales:

The sales forecast for product reflects the following unit and pricing assumptions:

YEAR	Units	Unit Price	Product Revenues*	Service Revenues	Total Revenues
1	42	$28,500	$ 1,197	$ 81	$ 1,278
2	137	27,000	3,699	572	4,271
3	300	25,000	7,500	1,509	9,009
4	710	23,500	16,685	2,499	19,184
5	1,690	22,100	37,349	3,934	41,283

* 000s omitted: small rounding adjustments included

- Product revenue is recognized at time of shipment
- Declining unit prices reflect savings from economies of scale as well as a more competitive environment beginning in year two
- Total revenue reflects the company's target of owning 10% of the market by year five
- Service revenue increases are due to growing product-installed base

Expenses:

- Salaries are based on competitive compensation
- Operating expenses include estimates for supplies, travel and telephone

Balance Sheet:

- Accounts receivable are collected 72 days from sales (turnover rate of five times a year)
- The reserve for warranty is 2% of product sales
- Organizational costs are amortized over three years
- Inventory is assumed to turn on average three times a year

- Fixed assets include both purchased equipment and leasehold improvements
- Depreciation is based on three- to five-year lives
- Accounts payable reflect a 60-day payment cycle
- Accrued expense includes overhead cost, service cost and operating costs for one month
- Salaries are paid bi-monthly
- Taxes are paid in the month following each fiscal quarter and are assumed to be at a combined rate of 40%
- Income tax expense assumes that losses will carry forward until income is earned. Years three and four tax expenses are reduced by the net loss carryforwards of prior years
- Preferred and common stock are issued as shown

Cash-Flows Statement:

- The cash-flows statement is based on the spending and payment decisions of the income and balance sheets
- Equity investment includes founders' and initial investors' common stock of $500,000, plus the venture capitalists' investment of $1,500,000

TIPS FOR THE PLAN PREPARER - FINANCIAL CALCULATIONS

$$\text{Accounts Receivable, Net} = \frac{\text{Sales}}{\text{Average Accounts Receivable}^{*}}$$

$$\text{Accounts Payable (for Year 1)} = \frac{\text{Purchases} + \text{Ending Inventory} \times \text{Payment Cycle}}{\text{360 days}}$$

$$\text{For Following Years:} \quad \frac{\text{Purchases} + \text{Average Inventory} \times \text{Payment Cycle}}{\text{360 days}}$$

$$\text{Inventory Turns} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

$$\text{Accrued Expenses} = \frac{\text{Overhead} + \text{Service Cost} + \text{Total Operating Expense}}{\text{12 months}}$$

$$^{*}\text{Average Accounts Receivable} = \frac{\text{Beginning Accounts Receivable} + \text{Ending Accounts Receivable}}{2}$$

Beyond the Three Keys

1. Tips to Separate Your Plan From the Rest

- Spend time writing a succinct and persuasive executive summary, but write the body of the business plan first.
- Create a professional, graphically pleasing document. Make sure that it is well indexed for easy reference. Number copies sequentially so that investors will know that only a select few copies are being distributed. Include a cover letter addressed to a specific contact person in the firm and follow up with a phone call. Include a phone number where the investor can reach you with questions.
- Use references or introductions from sources respected by venture capitalists. Have your plan referred through an accountant or attorney with a strong venture capital practice.
- Spend time researching potential venture capital investors so that you send the plan only to those who specialize in making investments to companies in your industry. This research may also help you discover something about the investor that you can use to get your plan noticed.
- Plan the fund-raising strategy through several rounds. The initial financing will typically lead to subsequent rounds, and presenting a realistic timeline demonstrates to an investor that the plan is carefully prepared.

2. Alternative Financing Sources

a. Friends and Relatives

Many companies have financed their development stages through the help of friends and relatives. Points to consider include: (1) how much equity to give to these early investors; (2) how to keep family relationships intact if the venture fails; and (3) involvement of family members in the daily operation of the business.

b. Angels

Angels are generally wealthy individuals who are former entrepreneurs or executives who invest in entrepreneurial companies. There are many investment clubs across the country that serve as a network for such individuals. The National Venture Capital Association (NVCA) publishes a listing of these clubs. The NVCA's address is in the appendix of this publication.

The Technology Capital Network (TCN), which is affiliated with the MIT Enterprise Forum, is a computerized matching service for angels and entrepreneurs. Their address is also listed in the appendix.

c. Debt Instruments

If the business opportunity you are pursuing is the purchase/expansion of an existing business, you may want to consider various debt instruments. Advantages include retaining equity, fixed interest payments and flexible payment/payback terms. Convertible debt is useful for companies that have a high degree of risk but do not want to give up a large portion of equity. The conversion feature of convertible debt is attractive to investors or banks who typically make loans but require equity for their added risk.

d. Joint Ventures

These have become increasingly popular for medical/biotechnology companies in the past few years, but any company can benefit from having a strong corporate partner. Joint venture agreements must be carefully structured to avoid relinquishing major shares of royalties or marketing rights to the partner. Expectations for both sides should be carefully documented.

How Coopers & Lybrand Can Help

Helping entrepreneurs obtain venture capital financing is an important part of our business. To prepare you for the rigors of the fund-raising process, our experienced professionals can assist you in all the areas covered in this publication.

Coopers & Lybrand can help in a variety of ways:

- Our National Venture Capital Group works closely with the venture capital and entrepreneurial communities. Business plans referred to the group are targeted and introduced to those venture capitalists most likely to be interested in a particular venture.
- Our specialists review and critique business strategies and plans, and can act as a sounding board to prepare for that crucial first meeting with a venture capitalist.
- Based on our experience with hundreds of new ventures, we know how to advise on the structuring and pricing of the financial agreements between you and the venture capitalist.
- We are the exclusive licensee of the Bell/Mason Diagnostic, an expert system developed by C. Gordon Bell and Heidi Mason to evaluate risk in young technology companies. This diagnostic can be a critical aid in fund-raising efforts, by highlighting issues and offering solutions before you meet with venture capitalists.
- We have published the following reports offering insights intn the process of raising capital:
    - *Venture Capital: The Price of Growth, 1993 Update*
    - *Charting a Course for Corporate Venture Capital*
    - *What Do Venture Capitalists Think About Biotechnology?*
    - *What Do Venture Capitalists Think About Superconductivity?*
    - *The Annual Economic Impact of Venture Capital Study*

For complimentary copies of these or any of our other publications, please contact our publications library in New York (212-536-3257).

Should you have any questions or require advice in structuring, pricing or negotiating your venture capital financings, please call the high technology and venture capital partner in the Coopers & Lybrand office nearest you or call Alan L. Earhart, Chairperson of the C&L National Venture Capital Group, in San Jose (408-295-1020).

About Coopers & Lybrand

Coopers & Lybrand is one of the world's leading public accounting and consulting firms. We serve a diverse clientele through a network of offices in 100 U.S. cities and through member and associated firms in approximately 120 countries around the world.

In addition to our leading position in the venture capital industry, the Firm offers a range of services in five distinct core businesses: business assurance, tax, human resource advisory, performance improvement—consulting to management and process management.

Coopers & Lybrand's National Venture Capital and High Tech Networks

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Valley Forge	Francis J. Van Kirk	(215) 993-3800
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Spokane	Gordon E. Budke	(509) 455-9300
WISCONSIN		
Milwaukee	Ronald T. Beckman	(414) 271-3200

Appendix

Guides to Venture Capital

- *Pratt's Guide to Venture Capital Sources*, edited by David Schutt and Yong Lim, Venture Economics Publishing, a division of SDC Publishing, Inc., 40 West 57th Street, Suite 802, New York, NY 10019.
- National Venture Capital Association, 1655 North Fort Myer Drive, Suite 700, Arlington, VA 22209.
- Technology Capital Network, MIT Enterprise Forum of Cambridge, Inc., 201 Vassar Street, Building W59-MIT, Cambridge, MA 02139.

The Coopers & Lybrand Commitment

To provide the ***quality*** *of service expected by our clients; to develop individual* ***initiative*** *and help our people fulfill their potential; and to foster a sense of* ***teamwork****—among our people and with our communities.*

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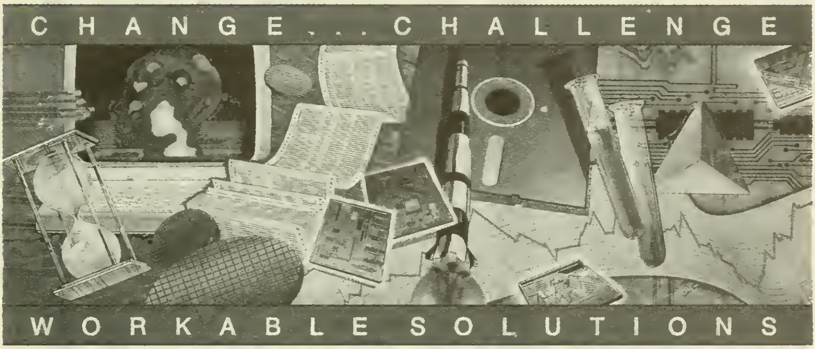
Third Annual Economic Impact of Venture Capital Study

by Coopers & Lybrand and Venture Economics



Solutions
for Business^{sm}

Conducted For:
National
Venture
Capital
Association

ABOUT THE SURVEY

Coopers & Lybrand and Venture Economics conduct this annual survey for the National Venture Capital Association to analyze the impact venture-backed companies have on our economy. This is the third year of our study. We sent the survey to 1,500 young, venture-backed companies. Consistent with previous years, 246 (16 percent) usable responses were returned. A number of this year's respondents were new to our study. Thus, over the past three years, a total of 428 companies have responded to the survey. Unless otherwise stated, survey conclusions are based upon the information reported by the 246 current respondents providing data for the period 1985 - 1991.

The National Venture Capital Association

The NVCA is an association of over 200 professional venture capital organizations with over $20 billion of capital under management. Venture capital firms organized the association in 1973 to foster a broader understanding of the importance of venture capital to the vitality of the U.S. economy.

The NVCA also represents over 4,000 emerging growth companies through the American Entrepreneurs for Economic Growth. The AEEG is the largest entrepreneurial network, representing over 350,000 jobs in the United States.

Coopers & Lybrand

Coopers & Lybrand is one of the world's leading public accounting and management consulting firms with offices in major cities around the world. Coopers & Lybrand's High Tech and Venture Capital Groups include over 1000 accounting, auditing, tax and consulting professionals providing value-added services to emerging and mature technology companies.

Venture Economics

Venture Economics is recognized internationally as the authoritative source of information on venture capital and related investment activity. The company provides a complete family of information and advisory services and publications to venture capitalists, corporations, and government organizations fostering business development activities.

For details on the survey contact:

National Venture Capital Association	***703/351-5269***
Coopers & Lybrand	***617/574-5292***
Venture Economics	***201/622-4500***

EXECUTIVE SUMMARY

Professional venture capital aggressively stimulates the economy of the United States.

- Through the long-term investment of venture capital funds, young companies secure the equity needed to generate a stream of economic benefits.
- Job creation is often dramatic at these young companies. The 428 venture-backed companies in our database efficiently created a net 92,500 highly skilled U.S. jobs between 1985 and 1991. During just the past five years and through the recent recession, the survey companies posted a significant 18 percent job growth per year. Yet, during this same time period, the Fortune 500 companies cut jobs at a rate of 2 percent each year.
- The United States' technological future realizes a tremendous benefit from the almost $3 billion the 428 survey companies invested in research and product development (R&D) from 1985 to 1991. As a percentage of shareholders' equity, current survey participants invest more than twice as much in R&D as Fortune 500 companies.
- Even though many of these young companies are not yet profitable, as a group they paid just over $1 billion in federal and state taxes in 1985 - 1991. As high-growth businesses, their contribution to the nation's tax coffers will grow rapidly.
- Through the investment of professional venture capital as their most important equity source, these young survey companies quickly benefit the U.S. economy and show meaningful promise for continued gains. In the first five years of their existence, the ventures produced jobs at a compounded average of 48 percent each year. Assets grew 42 percent a year. Investment in plant, property and capital equipment rose an average 64 percent each year. Commitment to R&D expanded on average of 50 percent annually. Tax payments swelled 79 percent per year. Export sales multiplied 206 percent compounded annually.
- Venture-backed companies experience exceptional sales growth rates, on average 35 percent in constant dollars each year, giving much needed support to the U.S. GDP. This helps our country maintain its international competitive advantage.

Entrepreneurs increasingly depend upon venture capital as their main source of equity to fund and nourish high-growth businesses.

- The surveyed venture-backed companies expended 50 percent of their hard-won equity to finance their assets. Fortune 500 companies, with their greater access to other financing options, needed to spend only 31 percent of their equity on assets.
- The start-up ventures in our survey that were founded between 1986 - 1991 required an average equity investment of $14.6 million to build their companies. This is a 108 percent increase from the equity requirements for ventures founded between 1981 - 1985. Professional venture capitalists supply the majority, 56 percent, of the equity needed by these high-growth companies.

WHAT IS PROFESSIONAL VENTURE CAPITAL?

The National Venture Capital Association (NVCA) defines "professional venture capital" as capital provided by firms of full-time professionals who invest alongside management in young, rapidly growing or rapidly changing companies that have the potential to develop into significant competitors in regional, national and global markets.

The most visible venture capital money comes from professionally managed venture capital firms. Generally these are private partnerships or closely held corporations funded by an informal network of investors that include: pension funds, insurance companies, endowment funds, foundations, bank holding companies and their affiliates, corporations, wealthy individuals, foreign investors and the venture capitalists themselves.

Venture capitalists generally are characterized by the following common features:

- They finance new and rapidly growing companies;
- They develop an innovative business idea — often high technology-based — for a product or service;
- They add value to the company by active participation;
- They take higher risks with expectation of higher rewards;
- They have a long-term orientation; and
- They purchase equity securities.

Professional venture capitalists assist young companies by carefully screening both the technical and business merits of proposals and by investing risk capital — usually with no cash repayment schedule. They work actively with the management of their portfolio companies, contributing the experience they and their firms have developed helping other companies with similar growth challenges.

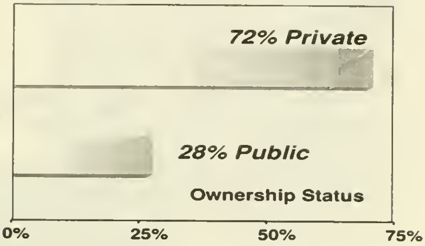
The risks and returns of venture investing are stabilized by including investments in several young companies in a single venture capital fund and by co-investing in those companies with other professional venture firms. That stability and the returns achieved by professional venture firms have attracted funds from institutions and foreign investors, thereby significantly increasing the flow of capital into young American companies.

Since World War II the professional venture capital industry in this country has played an indispensable role in nurturing the growth of America's high technology industries. Companies like Digital Equipment Corporation, Data General, Apple, Compaq and Sun Microsystems are famous examples in the computer industry. Both Intel in the late 60s and Cypress in the early 80s were venture-funded start-ups in the semiconductor industry, along with Microsoft and Lotus in software. Professional venture capital has made it possible to create entirely new industries in this country through the success of companies like biotechnology pioneer, Genentech, and Federal Express. ■

PARTICIPANT PROFILE

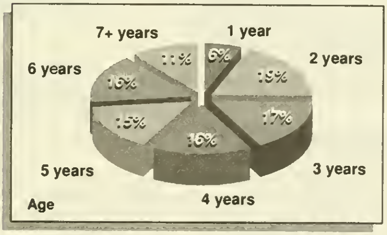
Seventy-two percent of this year's respondents are privately held companies. Because the data provided by these private ventures is typically not publicly available, this study provides a rare sketch of the impact young, venture-backed companies have on our economy. The average public company in the survey made initial public offering five years from their founding date.

Most Are Private



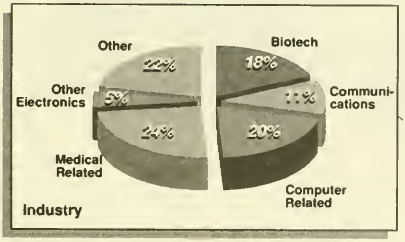
The survey targets young participants. It is during the start-up years that venture capital plays a vital role in the nourishing of a successful company. This year's respondents average 4.3 years in business.

These Companies Are Young



Venture capitalists tend to invest in the engine driving U.S. economic growth — technology. Over 75 percent of our survey respondents are technology related. According to the *1992 U.S. Industrial Outlook*, technology related industries are expected to grow rapidly through 1992, an average 6.4 percent. This is two and a half times more than the output for the manufacturing sector as a whole. The "Other" piece of the pie in the chart includes venture-backed companies in the consumer-related and service industries.

They Focus on Technology



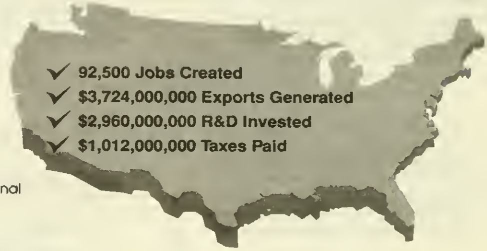
FUNDS INJECTED INTO OUR ECONOMY BY PROFESSIONAL VENTURE CAPITALISTS STIMULATE GROWTH IN MANY AREAS

We tracked down the companies who had responded in previous years but didn't supply 1991 data. Ninety-three percent continue to grow. To calculate the impact the entire database of 428 companies has had on our economy, we extrapolated the 1991 data for these still existing companies.

JOBS:

The equity supplied by professional venture capitalists kindles job growth. By 1991, the 428 young enterprises in the total survey database created over 92,500 new jobs in the United States or an average of 216 jobs per company.

Professional Venture Capital Nourishes the Economy



✓ **92,500 Jobs Created**
✓ **$3,724,000,000 Exports Generated**
✓ **$2,960,000,000 R&D Invested**
✓ **$1,012,000,000 Taxes Paid**

Survey Results 1985 - 1991

EXPORTS:

Newly-founded, venture-backed companies also generate significant export sales, helping to reduce our trade deficit. The term "international start-up" is often used to describe today's new companies that are instantaneously competitive in the global markets. Survey companies recorded $3.7 billion from sales abroad during 1985-1991.

R&D:

The R&D commitment of these technology-oriented survey companies does much to expand America's technical prowess. From 1985-1991, participating companies invested almost $3 billion to create and improve their products, often spawning new technologies and even industries in their wake.

TAXES:

The lag time between developing the technology and manufacturing the product can be years. Yet these 428 young companies paid corporate taxes of over $1 billion in the period studied. As these high-growth companies mature, they will supply the economy with rapidly rising tax contributions.

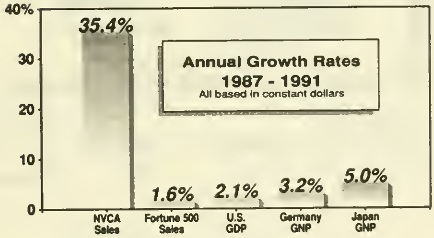
Venture Capital Sows Seeds for Accelerated Growth

These venture-backed companies hit the ground running, quickly benefiting the U.S. economy. Their compound average growth rates, shown for just their first five years of life, illustrate the importance of young growing companies to our country's future. Acknowledging the small initial base from which these averages are calculated, it is still clear that with continued risk equity backing, an expanding stream of benefits will be harvested from this crop of 246 young companies.

THE FIRST FIVE YEARS GROWTH RATES

Jobs	*48%*
Assets	*42%*
Plant, Property & Equipment	*64%*
R&D	*50%*
Exports	*206%*
Taxes	*79%*

Venture-Backed Companies Boost U.S. Competitiveness



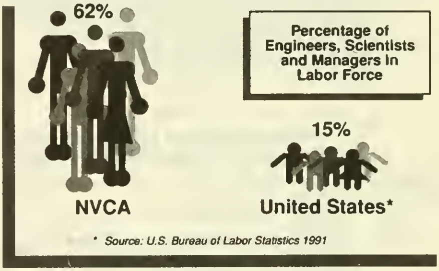
Source: International Financial Statistics

Venture-backed companies strengthen U.S. international competitiveness. Over the past five years, survey companies' compounded average sales growth, 35.4 percent based in constant dollars, dwarfed the Gross National and Domestic Product increases in Japan, Germany, and the U.S. During the same time period, the surveyed companies' revenue growth rate, again based in constant dollars, also eclipsed the revenue growth rate of the Fortune 500.

YOUNG VENTURE-BACKED COMPANIES ARE MAJOR ENGINES OF JOB CREATION

Many of today's leading economists argue that America's economic leadership in the 21st century will be based on the solid foundation of a technically skilled work force. Young, venture-backed companies generate the type of skilled jobs that will keep the U.S. dominant. The percentage of highly skilled positions for scientists, engineers and managers created by our survey companies is over four times greater than the percentage of skilled jobs created in the economy as a whole. As these survey companies expand operations, the percentage of production and other positions should also increase.

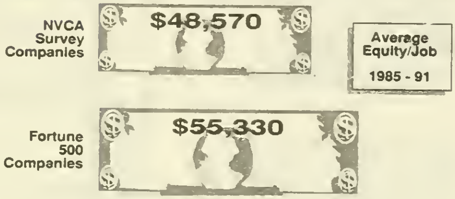
Venture - Backed Companies Create A Greater Percentage of Skilled Jobs



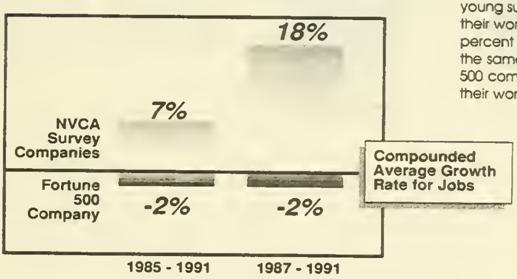
* *Source: U.S. Bureau of Labor Statistics 1991*

Not only do these young companies create a larger proportion of highly skilled jobs, they do so more cost-efficiently. Given the high price of equity, these growing companies use 12 percent less equity to create a job than Fortune 500 companies. Additionally, understanding that bioscience companies are highly equity intensive, we compared the efficiency of job creation in the 203 non-bioscience survey companies against the Fortune 500 companies. The non-bioscience companies needed only $44,500 to create a job, almost 20 percent less than Fortune 500 companies.

Venture-Backed Companies Create Jobs More Efficiently Than Fortune 500 Companies



Venture-Backed Companies Aggressively Grow Jobs

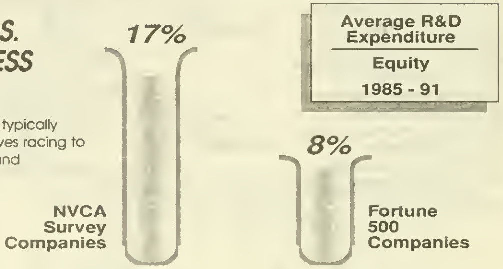


Despite the increased difficulty of obtaining investment equity to finance job growth during the country's recent recession, our young survey companies increased their work force an average of 7 percent per year since 1985. During the same time, 1985-1991, Fortune 500 companies cut 2 percent of their work force per year. Looking at just the past five years, venture-backed companies rallied an impressive 18 percent job growth per year, compared to the persistent 2 percent job loss at Fortune 500 companies from 1987-1991.

VENTURE-BACKED COMPANIES QUICKLY CREATE NEW TECHNOLOGIES AND PRODUCTS, ENHANCING U.S. COMPETITIVENESS

Venture-backed companies typically spend the first years of their lives racing to produce new technologies and products that strengthen America's competitive edge. Without access to debt financing, these growing companies often depend on the equity invested by venture capitalists to fuel their R&D engines. The 246 companies in our current survey invested over twice as much of their equity in R&D as Fortune 500 companies. The 428 companies in our entire database poured almost $3 billion into R&D efforts that will enhance the United States' competitive position in world markets for years to come.

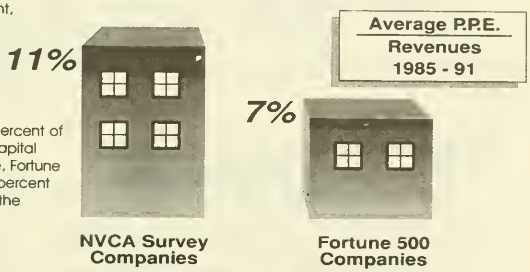
Investment Equity Fuels the R&D Engine



VENTURE-BACKED COMPANIES SPEND A GREATER PERCENTAGE ON LONG-TERM CAPITAL INVESTMENTS, STRENGTHENING OUR ECONOMY AND CREATING JOBS FOR OUR LABOR FORCE

Venture-backed companies' aggressive investment in plant, property and capital equipment (P.P.E.) fortifies our economic recovery and creates much needed jobs for our country's labor force. From 1985 - 1991, survey companies spent 11 percent of their revenue on long-term capital investment. At the same time, Fortune 500 companies spent only 7 percent of their revenue investing for the future.

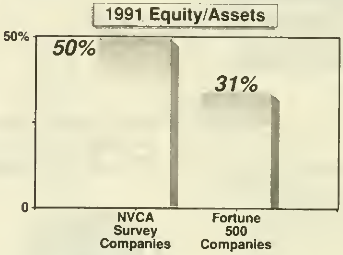
Venture-Backed Companies Invest A High Percentage of Revenues in Plant, Property & Equipment



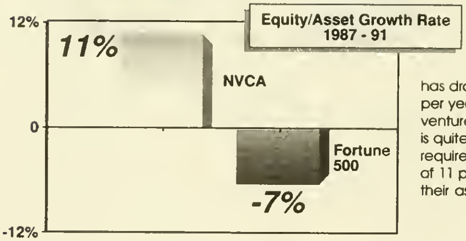
CRITICAL ASSETS ARE FINANCED THROUGH HARD-WON EQUITY

Young companies are investment equity intensive, having little access to the financing options available to larger companies. As a result, venture-backed companies must allocate a significant portion of their equity base to support their assets. In 1991, 50 percent of the equity raised by the surveyed companies was used to support assets. By contrast, Fortune 500 companies needed only 31 percent of their equity base to finance assets.

Survey Companies Largely Finance Assets Through Investment Equity



Venture-Backed Companies Go To the Equity Well More Often To Support Asset Growth

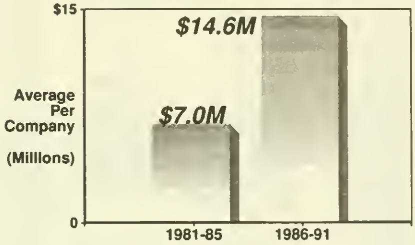


These Fortune 500 companies require less and less equity to finance the same level of assets. Since 1987, their need has dropped an average of 7 percent per year. For the equity-hungry venture-backed companies, the story is quite different. Their equity requirements have grown an average of 11 percent each year to support their assets.

THE POSITIVE ECONOMIC IMPACT OF VENTURE-BACKED COMPANIES REQUIRES AN INCREASING INJECTION OF INVESTMENT EQUITY

Creating an on-going benefits stream of job creation, technological advancements, exports, capital expenditures, asset growth and tax revenues — all of which strengthen America's competitive advantage — comes at a price. The equity price tag facing entrepreneurs has climbed over the years. A previous NVCA/American Electronics Association/Coopers & Lybrand study determined that venture-backed companies founded between 1981 -1985 raised $7 million on average in their first few years of life. Each current survey respondent founded between 1986 and 1991 required, on average, $14.6 million over these initial years. This is an increase of 108 percent.

Initial Funding Required by Survey Participants Grows



These Companies Depend on Investment Equity

Sources of Equity

Venture Capitalists	Founders	Private Investors	Other
56%	23%	12%	9%

1985-1991

These entrepreneurial companies have few avenues to turn for the equity investment they need to grow and prosper. They are dependent on the investment equity provided chiefly by founders, private investors and venture capitalists. Investments by professional venture capitalists play a pivotal role, supplying 56 percent of the foundation equity for these new companies. Other tax-sensitive investors also play important roles. Together, these sources of equity contribute to the U.S. economy by investing in these high-growth companies.

Coopers & Lybrand's National Venture Capital and High Tech Networks

ALABAMA		
Birmingham	William T. Bishop, Jr.	(205) 252-8400
ALASKA		
Anchorage	Luis M. Puncel	(907) 274-3602
ARIZONA		
Phoenix	Stephen A. Clark	(607) 280-1800
Tucson	Michael J. Dutton	(602) 792-3660
CALIFORNIA		
Los Angeles	James E. Siegfried	(213) 356-6000
Menlo Park	James D. Atwell	(408) 295-1020
Newport Beach	Harold A. Hurwitz	(714) 251-7200
Oakland	Richard D. Baker	(510) 834-5400
Sacramento	Mickey J. Friend	(916) 441-4334
San Diego	Patrick T. Sullivan	(619) 525-2300
San Francisco	Cynthia L. Feldmann	(415) 957-3000
San Jose	Alan L. Earhart	(408) 295-1020
Sherman Oaks	Massoud Entekhabi	
COLORADO		
Denver	Robert S. Woodruff	(303) 573-2800
CONNECTICUT		
Hartford	Raymond W DelGobbo	(203) 722-1900
Stamford	Donald G. Brenner	(203) 326-8400
DISTRICT OF COLUMBIA		
Washington, D.C.	Edward A. Bartka	(202) 822-4000
FLORIDA		
Fort Myers	Rudolph W. Meyer	(813) 433-0888
Jacksonville	Patrick J. Haley	(904) 354-0671
Ft. Lauderdale/ Miami	Edward S. Mahler	(305) 263-8200
Orlando	Ronald M. Cofield	(407) 843-1190
Tampa	Andrew J. McAdams, II	(813) 229-0221
West Palm Beach	Warren W. Blanchard, Jr.	(407) 686-9300
GEORGIA		
Atlanta	Daniel A. Giannini	(404) 870-1100
HAWAII		
Honolulu	Arthur C. Tokin	(808) 531-3400
Wailuku, Maui	Russell Yamane	(808) 244-5527
IDAHO		
Boise	Susan L. Steen	(208) 343-4801
ILLINOIS		
Aurora	Michael P. Flood	(708) 859-3530
Chicago	Edmund B. Galvin	(312) 701-5500
Rockford	Stephen P. Casper	(815) 394-0300
INDIANA		
Elkhart	Robert L. Giel	(219) 294-7441
Fort Wayne	Charles R. Schrimper	(219) 423-1531
Indianapolis	Robert E Engle	(317) 639-4161
South Bend	Frank J. Criniti, Jr	(219) 234-4021
IOWA		
Des Moines	G. Michael McDaniel	(515) 282-9141
KENTUCKY		
Lexington	H. Samuel Strader, Jr.	(606) 255-3366
Louisville	David S. Jordan	(502) 589-6100
LOUISIANA		
New Orleans	David O. Figueroa	(504) 529-2700
MAINE		
Portland	Linwood E. Bell	(207) 774-4541
MARYLAND		
Baltimore	James T. Caulfield	(301) 783-7600
Rockville	James A. LaTorre	(301) 417-7300
MASSACHUSETTS		
Boston	Paul G. Joubert	(617) 574-5000
Springfield	John M. Ryan	(413) 781-7200
MICHIGAN		
Detroit	Mark F. Matthews	(313) 446-7100
Grand Rapids	Stephen P. Stoddard	(616) 458-7700
MINNESOTA		
Minneapolis	James P. O'Donnell	(612) 370-9300
MISSOURI		
Kansas City	Richard E. Thode	(816) 474-6800
St. Louis	Michael R. Liesmann	(314) 436-3200
NEBRASKA		
Lincoln	Bruce A. Hocking	(402) 475-7633
Omaha	George J. Behringer	(402) 344-4545
NEW HAMPSHIRE		
Manchester	Richard B Murray	(603) 669-2200
NEW JERSEY		
Parsippany	Stephen A. Kamas	(201) 829-9000
Princeton	Jack E. Stover	(609) 452-0540
NEW YORK		
Albany	David J. Grand	(518) 462-2030
Melville	Douglas W. Kurz	(516) 753-2700
New York	Robert A. Fish	(212) 259-1000
Rochester	Gerald F. Shanahan	(716) 546-5295
Syracuse	Michael Schini	(315) 474-8541
NORTH CAROLINA		
Charlotte	Bryan O. Walker	(704) 375-8414
Raleigh	Jeffrey T. Barber	(919) 755-3000
OHIO		
Akron	Philip H. Reed, Jr.	(216) 253-7100
Cincinnati	Thomas J. Mangold	(513) 651-4000
Cleveland	Donald J. Dailey	(216) 241-4300
Columbus	Donald B. Bush	(614) 225-8700
Dayton	Franz J. Hoge	(513) 223-5185
OKLAHOMA		
Oklahoma City	Larry A. Evans	(405) 236-5800
Tulsa	George A. Schulz, Jr.	(918) 596-8200
OREGON		
Eugene	John W. Joyce	(503) 485-1600
Portland	Richard A. Raman	(503) 227-8600
PENNSYLVANIA		
Harrisburg	Kevin M. Mitchell	(717) 231-5900
Philadelphia	Bradley J. Allen	(215) 963-8000
Pittsburgh	Theodore G. Glyptis	(412) 355-8000
Valley Forge	Francis J. Van Kirk	(215) 993-3800
PUERTO RICO		
San Juan, Hato Rey	Raymond A. Figueroa	(809) 756-6050
TENNESSEE		
Knoxville	Jim R. Shelby	(615) 524-4000
Memphis	J. Vincent Robinson	(901) 529-1100
TEXAS		
Austin	Gary C. Prasher	(512) 477-1300
Dallas	M. Wesley Jordan, Jr.	(214) 458-8000
El Paso	Geoffrey L. Barnett	(915) 545-5800
Fort Worth	Ronald W. Clinkscale	(817) 332-2243
Houston	Sidney R. Andrews	(713) 757-5200
Lubbock	Ben F. Robinson	(806) 744-3333
UTAH		
Salt Lake City	Craig M. Jacobsen	(801) 531-9666
VIRGINIA		
Lynchburg	Robert C. Morris	(804) 948-9000
Newport News	Stephen D. Halliday	(804) 873-0030
Norfolk	Stephen D. Halliday	(804) 625-2535
Richmond	Gerald F. Barber	(804) 697-1900
Tysons Corner	Thomas W Garrett	(703) 506-3800
WASHINGTON		
Seattle	Clair L. O'Keefe	(206) 622-8700
Spokane	Gordon E. Budke	(509) 455-9300
WISCONSIN		
Milwaukee	Ronald T. Beckman	(414) 271-3200

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Testimony

Of

E. Lance McCarthy

Director-Industrial Policy Development

St. Louis Economic Conversion Project

before the

Subcommittee on Economic Growth and Credit Formation

Committee on Banking, Finance and Urban Affairs

United States House of Representatives

November 16, 1993

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Chairman and members of the committee I would like to extend a very warm and sincere thanks for you allowing me to speak today before the House Subcommittee on Finance, Banking and Urban Affairs. My Name is E. Lance McCarthy and I am the Director of Industrial Policy Development for the St. Louis Economic Conversion Project. We are a Private/Non-Profit organization with the purpose of assisting military contractors in their effort to convert to the commercial sector to produce quality goods and services.

You all understand fully that it is imperative we provide leadership in technological development as we approach the 21st century. We face huge projected downsizing of defense coupled with the the rapid growth of the information age . The global market is increasing and the more cohesive our national team is with technological developments, the more ept we will be in rebuilding our manufacturing base and reestablishing our economic infrastructure.

We must assess the best way possible to transform existing patents, not just government but university and private sector as well, into products to be sold to national and international markets: products that are driven by demand and by human need (rather than high-tech supply). Further, we must provide a vehicle for small business to grow and become more efficient because it is the small firms that can change with the technology, that have the flexibility to form joint ventures around the world, and that remain committed to their local community here at home. I'm going to recommend equity investment as a means of public/private partnerships.

My testimony will focus on defense conversion technology, in addition to existing patents and the role of government as it relates to equity investing. Presently there has been some attempts by government in this issue, this has been in the Bill sponsored by the House :HR-820............and by the Senate , which is still on the floor S-4................

Although these are reasonable in their efforts, it is necessary to allow the private sector to perform in its area of expertise and develop a partnership with the government. Thus, my financial research was prompted by three reasons:

(1) Defense conversion is a serious problem; the defense and aerospace business has generated industrial competencies that we want to preserve.

(2) Second, I believe that there are significant financial opportunities in this military sector, that would promote new companies thus, providing new jobs. This growth could be realized in the long term and in the short term as well; contrary to popular opinion not all defense companies are inefficient producers- these are some of the best and brightest people we have.

(3)The third reason is that I sincerely believe strongly that while the government can assist in the transition of financing new technology and this transition, the government is not the solution alone when it comes to equity investment. The solution comes with a public/private debt/equity partnership.

Capital exists within the private sector for these activities at an order of magnitude more than could ever be found in government. As I've spoken with top investment bankers, and economists there was a general consciences. These professionals are skilled in the ways of the capital markets and the defense industry, and have access to the capital. They can translate defense opportunities in a way that is understood by Wall Street.

Obstacles to Defense Technology and Conversion

There are few links between the defense world, the commercial world, and the financial markets; and few people who are able to understand these three. On the venture capital side there is a well established network of venture capitalists. They receive well thought out/well presented business plans every day -- something defense companies and national laboratories are not accustomed to doing. For the most part there is lack of defense industry knowledge among the venture capitalists and the comfort level is not high. With other industries, such as biotech , the comfort level is high because of decades of investment experience. In addition, the biotechnical financial returns have historically been high, giving little reason for these venture capitalists to risk going into new, complex areas when fortunes are still being made in the old.

There are two groups who would look at these military companies; strategic buyers and financial buyers. The strategic buyers view many of these companies as too small to deal with. With financial buyers there is a general lack of knowledge of the industry and, (outside of their interest in some of the larger defense companies whose stocks have increased dramatically over the past few months as they have sold off parts of the store) they do not perceive the industry sector as a good investment.

This nation has faced the problem of defense conversion before:Why then, is the solution so elusive? One reason is the magnitude of the problem. Another is our tendency to focus a disproportionate amount of time seeking salvation from government -- a government which is facing severe limits on the availability of public funds. The greatest problem however, is the gap that exists between the defense industry and the corporate world. It is these capital markets which can and should transition the defense industry and government-owned technology.

Criteria For Successful Conversion

The solutions for financing government owned technology and defense conversion should come from both the private and public sectors. First, it is important to look at the criteria for successful transition. Basically you need five ingredients:

1.) Manufacturing Engineering- For adequate funding and profitability we need a strong manufacturing link among government , the university arena, and the manufacturing market. We need to give manufacturing engineering some glamour, recognize that it is just as important as aerospace, and we need to start a campaign to place more emphasis on this area. We lose to foreign competition due to their emphasis on this area and our lack thereof.

2.) Integrated Technology Base-Successful conversion , there needs to be an integration of the technology base. Government regulations and controls on defense companies and national laboratories have segregated the commercial and military industry and created inefficiencies in both systems. Artificial barriers should be removed to allow for a wide diffusion of technology and accelerate the flow. NIST, ARPA, and the National Center for Manufacturing Sciences are doing good work but we have a ways to go.

3.) Access to Capital- Capital exists in the private markets for defense conversion. However, there is a long standing skepticism of the defense industry (high cost production, cost overruns, inefficiecny, time to market) by private investors and a general lack of understanding of the advance technology resident within the defense community, much of which has been cloaked in secrecy.

4.) Strategic Direction- Within the defense and aerospace industry the landscape has shifted dramatically among the larger companies. The second and third tier companies, the core of our technology base, have been less focused. Many sectors remain fragmented with overcapacity. Few creative ideas have emerged on how to restructure or consolidate these smaller companies and when they have emerged there has been a lack of understanding of and access to capital markets to assist in carrying out the plans. Again there is no catalyst or interpreter to assist in the transition process.

5.) Communication Between Divergent Corporate Cultures- Defense contractors and private industry have widely divergent views- private industry caters to a large, commercial , consumer oriented marketplace. They typically produce at the lowest possible cost, have high volume production runs and a short time to market. Quality is extremely important, but a toaster does not need to work for 100 years in a hostile environment. Defense contractors on the other hand have had largely one customer- the Department of Defense. Production runs are often low volume with long lead times, adjusted annually by budget changes . The prices are high, not just because of low volume, but also because of perfect reliability required by military specifications. The corporate cultures do not speak the same language and have trouble communicating. They are in need of an interpreter.

Of all these factors, access to capital is the most important factor- and access is dependent upon bridging the gap between the two cultures.

Problems with Current Programs

As currently designed, most programs and the TRP in particular, don't require these criteria for success. Worker training programs are useful, but not unless there is a clear vision of what kind of workers will be needed in the future and not unless jobs exist. Companies which are financially sound, growing , and creating jobs are best suited to design their own training programs. It is also commendable to attempt to fund markets. Still the government alone can't determine which companies and projects should receive that financing; private markets are a resource here.

Another problem with the TRP is that it encourages the mentality which predominates the defense industry, i.e. look to the government for dollars. The TRP also reinforces the process which the defense industry is accustomed to: wait for an RFP, make your proposal, then wait for the government to make a decision. The commercial world of finance that government patents and defense companies are going to have to learn to operate in does not work that way. Public/Private Financing is in accord with President Clinton's "Reinventing Government" proposals.

Government efforts should concentrate on facilitating private sector activities and getting more leverage form public dollars spent. In fact, one of the greatest shortcomings of both the defense conversion programs at both federal and state levels is this failure to leverage private investment capital. The TRP does attempt to involve private funds by requiring matching funds. This however makes it difficult for small companies to meet the requirement. The larger, better organized companies can usually not only come up with matching funds, they can find matching funds from other government programs; some also are driven by the desire to access the only new source of program dollars rather than a long term commitment to conversion. Both defeat the goal of attracting private sector capital to the TRP and financing existing patents owned by both the government and universities.

In short, the intent of the administration and Congress to assist in the equity financing of technology and defense conversion is correct-however, there are several obstacles to government solutions. The first is scarcity of public funds and the second is that government is not accustomed to dealing with commercial market forces. Consequently, I would like to propose alternative approaches which I believe are necessary as we look at government's role in equity financing.

Alternative Approaches

Is it really possible to leverage private investment capital? With returns on savings and money market accounts hovering at 2-3% , there is private capital available for any investment with a high probability of not losing money. Numerous promising opportunities exist, both in start ups requiring venture capital and the consolidating and restructuring of existing defense companies and existing government owned technologies.

The first example, the City-State Initiative, is that type of program that could be implemented in a low-volume venture capital type environment. This could easily be adopted in the Midwest. Venture capital has five tiers:

*Pre-seed
*Seed

*Start-up
*2nd level
*3rd level

This program would incorporate the first three levels which are most difficult to fund and the most difficult to acquire. In this proposal the state would appropriate $250,000 and the city/county would appropriate $250,000. The city's funds could be acquired from the Federal government. The management would be qualified based on prior fund management experience. I would also recommend here and in the other two initiatives below that the oversight committee is a citizen's board that gives access to organized labor, small business, minorities, and women. This isn't just the right thing to do; it is the smart thing to do. We would then leverage the government base of $500,000 to the private sector market. Debt-equity leveraging operates at a ratio of 10 to 1 and will generate an operating fund of $5,000,000 in private/public partnerships; the fund will make $100,000 - $300,000 investments based on market potential, profitability and social concerns.

This proposal would not only provide financing for new technology, but it would also generate a return that would be paid both to the private sector and government. These returns could be reinvested in a second fund. Such a fund is being investigated by Jim O'Donnell at Capital for Business as a model for a typical midwestern city.

The next proposal, a Regional Initiative, is larger in nature and could be set as a regional model where a more venture capitol intense environment is implanted. The Regional Fund would take direct investments from government agencies, for example the TRP. The company would then raise within the private capital markets additional funds, say an 8 to 1 basis. This could be done on a pilot project basis; the government would invest- and I stress invest not loan nor grant -$10 million and the investment company would raise an additional $80 million. With this investment fund, the company would provide capital to start companies which utilize defense technology to meet commercial marketplace needs and existing government owned technologies. It would also purchase all or part of existing defense companies, providing them the equity capital needed to diversify, consolidate, and restructure in order to remain profitable ;therefore saving existing jobs. **Success is easy to measure -it is the rate of return of investment.**

Quarterdeck Investments could lead such an effort. The president Jon Kutler has had the best of both worlds. Having served six years in the military he ventured to Wall Street. As an investment banker he constructed leverage deals of major defense contractors. Instead of trying to "push" technology out of a defense company, they look for a commercial need for a technology, then use their knowledge of the defense industry to find technology which meets that need. They are the leader in venture capital market as it relates to defense technology and is a model company for this venture.

Locally in St. Louis, there are three defense firms that could immediately benefit from public/private venture capital partnerships with their new technologies. Company A has developed an oil pump part with 20% more efficiency rate. Company B has developed a gas mask and high performance car parts and ,Company C has developed commercial applications as well. Commerce EDA provided St. Louis with a 1.3 million revolving loan. This is clearly not enough!!!!!The loan was applied for in 1991. Moreover, these companies represent $5 million dollars each in investments that could develop high returns and job stimulation.

In addition, to equity investments for new technology I propose that the government provide working capital in the form of grants to these new private/public partnerships. This would allow growth of more new companies, assisting in decreasing crime and unemployment. If such a equity/debt venture fund could be established and duplicated to all parts of the country, you would further the link between the defense industry and the private markets for further development of existing government technology, university technology, and defense conversion technology.

It is my recommendation this model program be implemented as soon as possible. Existing departments of the government should investigated for this initial fund ; specifically the EDA or a new form of SBA.

Conclusion

As we moved toward a global market it is mandatory that we focus on areas that could position us as a market leader. Technology in the 20th century led foreign competition to lead in development and economic growth. It is evident that we have existing government patents and leading technology for future growth. Although technology is the vehicle to economic sustainability and growth, it does not create jobs. It is the infusion of capital that creates jobs. The world is changing right in front of our eyes and the term "Reinventing Government" is becoming synonyms with change. We must adopt equity investments with public/private partnerships that will take advantage of existing government technology, university patents and defense conversion developments. It is here where we will find true domestic economic growth as we grow and enter the global economy of the 21st century.

Thank You

MONDAY, NOVEMBER 8, 1993

ST. LOUIS POST-DISPATCH

COMMENTARY

Spinoffs From An Industrial Policy

Government Intervention To Stimulate The Economy Gets Results

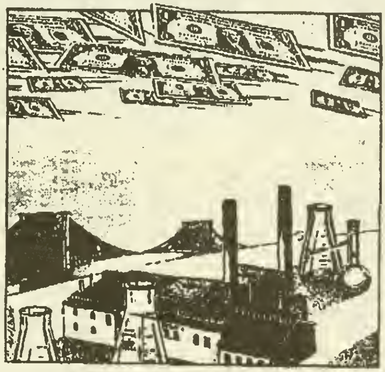
By E. Lance McCarthy

A cab driver I talked to the other day said, "I really like MetroLink because I'm getting more business, and my friends are as well." The moral: Government intervention to stimulate the economy gets results.

Today, we must encourage government intervention. We must adopt and implement an industrial policy to redevelop our industrial base and rebuild our urban infrastructure.

Industrial policy is not a new concept. Throughout history, our government has financed projects that have assisted in development of our country: railroads, bridges, pony express. Samuel Morse's $30,000 grant for a telecommunications machine in 1843 was a government incentive for our country's development. So was the building of our interstate network of roads in the 1950s.

Government must play a rule in revitalization today as it has historically. The increased erosion of our urban areas (housing, schools, businesses, factories) demands government strategies to resolve domestic problems. We must seize this time and use our technology to revitalize urban areas. Rehabilitating closed factories and industrial park development will infuse urban areas with vigor and pride.



We can combat recession, unemployment, poor education and minority exclusion by formulating an industrial policy. An industrial policy shaped in a democratic spirit will protect and develop the foundations of American communities — small business, new technologies and our commitment to fairness.

Every 100 manufacturing jobs generate 63 service-industry jobs, seven retail establishments, $2.5 million in payroll and $1.95 million in retail sales. A regional industrial policy committed to creating manufacturing jobs could:

- Reduce the cost of capital for private investment; for instance, not just by making city land available for industrial parks but by installing sewers and underground wiring, acquiring all necessary permits and providing day care when the site opens.
- Press for free and fair trade that encourages technology transfer and better working and environmental conditions worldwide.
- Adopt education programs that will lead to greater technological literacy, developing a more productive work force.
- Fund training programs that include women, blacks and Spanish-speaking Americans with emphasis on entrepreneurship and science.
- Encourage flexible on-the-job training and worker ownership.
- Provide adequate transportation and support for operations, equipment and modern facilities.
- Promote process engineering and manufacturing engineering by funding technical support and manufacturing-excellence programs.
- Participate in a national information infrastructure that gives small business, organized labor, women and minorities access to the decision-making process.
- Adopt a policy of sustainable development that promotes environmental and social concerns.

In St. Louis, one problem we face is how to extricate ourselves from dependence on military spending. The most crucial area here is finance. There are few venture capital opportunities because industry financing was always based on military contracts. Locally, several defense firms that attempted to convert to new technology, providing new jobs and redirecting their efforts toward the 21st century, were denied both public and private financing. Banks, for example, want new regulations that direct them to lend to conversion efforts. The banks see commercial-product development at military firms as high risk. Federal lending dollars are slow to arrive here and state money (MoBucks) has gone to McDonnell Douglas.

When these small manufacturers lost financing opportunities, St. Louis lost. We lost economically, environmentally and technologically. We must include tax credits, R&D funding and financing that will allow new developments and redirect the downward trend of our economy. We must include government-financing initiatives in our industrial policy to assist companies that develop jobs and revenue for our economy.

Military dependency is a comparatively old problem. Flood Relief '93 is a new crisis, an opportunity to shift defense technology and engineering skills to new needs, an opportunity to open President Bill Clinton's new budget enterprise zones in depressed areas. The laid-off defense engineer, trained in both civil and environmental engineering, will provide the backbone of redevelopment. Black colleges like Harris-Stowe can join the community colleges in providing engineering retraining as well as basic training for minority workers for both low-tech and high-tech jobs. These problems affect us directly. The need to change is imperative. The Japanese say, "Where there is crisis there is opportunity." Our political establishment must redirect its effort of job stimulation away from the glamor of stadiums, convention centers and football teams to a manufacturing agenda that rebuilds St. Louis internally and externally. Government by the people for the people demands that we all participate in rebuilding our industrial base to ensure our economic survival.

As the cab driver said, "The more individuals are given incentives to ride, the more they will spend." By adopting an industrial policy, we give them that incentive.

E. Lance McCarthy is director of industrial policy development for the St. Louis Economic Conversion Project. The preceding is adapted from remarks prepared for testimony before a congressional committee later this month

DRAFT TESTIMONY
FOR HOUSE BANKING SUBCOMMITTEE
ON ECONOMIC GROWTH AND CREDIT FORMATION

EQUITY INVESTMENTS, VENTURE CAPITAL, AND THE FEDERAL ROLE IN THE AVAILABILITY OF FINANCING FOR HIGH TECHNOLOGY COMPANIES

Good morning, my name is Joel Lee. I am Deputy Secretary at the Maryland Department of Economic and Employment Development, commonly referred to as DEED. I would like to thank the subcommittee for inviting a representative of state government to participate at this hearing. Those of us working in the states are on the front-lines seeking to address the needs of technology companies each and every day. I strongly believe we need a real state-federal partnership, if we are to make a difference on a scale that matters.

DEED is the lead state agency in Maryland promoting the formation and growth of technology companies. Maryland has a strong foothold in a number of technology industries, including telecommunications, computer systems integration and software, aerospace, medical biotechnology and environmental technology. We are also among the nation's leaders in basic research, ranking 1st in the nation in university R&D per capita and 2nd in federal R&D per capita.

Over the last three years, Maryland has confronted very difficult economic times. Many of our key growth engines in the 1980s have been hard-hit by the national recession, including construction, real estate, banking and services -- and show little signs of recovering their former vitality. At the same time, we are coming face-to-face with the challenges of adjusting to defense spending reductions, being the 5th most defense-dependent state in the nation.

The most promising avenue for restoring the state's economic health, both in the short term and long term, is to build Maryland's technology strengths. The State of Maryland has been aggressive in seizing that potential, enacting a wide-range of initiatives to support technology development, even in the midst of a severe fiscal crisis.

Perhaps no area of State support for technology development has received more attention and presented more demanding challenges than addressing the availability of financing for technology companies. The State of Maryland has put in place a comprehensive package of financing initiatives -- as impressive as any state. In Maryland, we offer technology companies a range of innovative financing tools, including matching grants for applied research, product development/seed financing investments and access to equity investments. We also provide technology companies access to more traditional financing tools such as working capital and facility financing.

We take particular pride in the Maryland Venture Capital Trust Fund. This fund, created by an initial $2 million state grant, is charged with investing a pool of $19 million, largely comprised of public pension funds, in privately managed venture capital funds who commit, on a best faith basis, to invest roughly three times the level of state investment in Maryland companies. The Maryland Venture Capital Trust Fund is governed by an independent board, who is focused both on return on investment and providing emerging Maryland companies access to hard to find venture capital. Nearly all of the Maryland Venture Capital Trust Funds have now been invested and we are beginning to see returns to the state.

Despite these efforts, we still have a long way to go to successfully tackle the issue of financing for technology companies. I would like to share with you what we see as the key financing needs for technology companies, how we hope to address the equity needs of technology companies in the future and how the Federal government can most effectively augment and compliment the efforts of states.

Financing Needs of Technology Companies

During this past summer, DEED surveyed our technology companies to learn first-hand about the availability of financing for these companies. What we found is quite disturbing.

First, the availability of financing is one of the most important factors affecting the ability of technology companies to do business. Only workforce quality was ranked higher than the availability of financing as a key factor in doing business by technology companies in Maryland. Technology businesses need: revolving lines of credit (81%), short term working capital (77%), equipment loans or leases (72%), and permanent working capital (70%). These are all debt-related financings that are typically -- with the exception of longer term working capital -- provided by commercial banks.

Second, nearly 4 out of ten technology companies do not have an ongoing borrowing relationship with any financial institution. Most technology companies responding to the survey did not believe that commercial banks have an active interest in providing financing to them. Approximately half of all technology companies who responded believed that the availability of financing is **harder to obtain now** than over the past five years, with one-third of technology companies believing it is much harder to obtain financing now.

Third, the types of financing technology companies are most typically turned down for are working capital and revolving lines of credit. Obtaining equipment loans does not appear to be a problem. For more than half the companies turned down for financing, there has been **a significant negative economic impact** -- 25% have had to postpone plans, 18% have had to scale down plans and 12% have had to cancel plans.

Finally, looking ahead to the next two or three years, the greatest financing need of technology companies in Maryland is for the development of new products or processes (67%). On its face this is a remarkably positive sign -- our technology companies are poised for the future. The concern is that new product development financing is not typically provided by commercial banks and venture capitalists will only fund those companies with healthy profit potential. For these types of non-traditional financings, technology companies have in the past been turned down more often than approved, whether it be for seed capital, convertible debt or later stage equity.

These findings suggest dramatic action is called for if technology companies are going to be able to access the capital they need to grow and prosper. In particular, the need for working capital and product development financing pose very difficult problems for technology companies. Waiting for private financial institutions to fill the void has proven to be a recipe for economic failure.

We are also confronting in Maryland two additional financing problems. One is the need to finance wet lab facilities for our growing biotechnology industry. Banks are unwilling to lend the needed capital to developers to ensure an adequate supply of space not because the demand is not apparent or companies cannot pay the market rate, but because of the high cost of tenant improvements and the lack of cash flow in these companies.

The other problem is how can we best support and finance the commercialization of block-buster research advances. Given Maryland's strong research base, this is a very significant concern. What we have noticed is that a gap between where technology transfer efforts end and venture capital investment begins. The missing ingredient to develop a successful new technology company is pre-start-up assistance to take a "high commercial potential or blockbuster" research discovery to the stage where it is able to attract traditional private sector venture capital seed funding.

New Initiatives for Maryland

Even though, Maryland has been aggressive in recent years in addressing the financing needs of technology companies, we find ourselves having to continue to push the envelope and create new financing initiatives.

Given the interest of this subcommittee on equity investments, I will focus primarily on Maryland's thinking in how to create new sources of hard-to-find product development and seed financing. I believe it is important not to lose sight of the need for more conventional bank financing for technology companies, particularly for working capital and facility development. Venture capital alone is not sufficient to meet the full array of financing needs for a growing technology company -- and as Maryland's survey of technology companies reveals conventional bank financing may be as hard or harder to find than equity investments.

Beyond the Maryland Venture Capital Trust Fund, which I described earlier, Maryland has two other ongoing financing tools to support product development and seed financing. One initiative is the Maryland Industrial Partnerships, which is a matching grant program for applied research undertaken in collaboration with a University of Maryland researcher. On average, the MIPs program is receiving $3 in private match (both cash and in-kind) for every $1 in state funding. The second initiative is the Maryland Challenge Investment Fund, which based on a competitive process invests in early-stage companies needing marketing or management assistance in return for royalties of 2 times the state's investment of $50,000. These two product development tools are working well and hopefully will receive increasing state support in the years to come.

In terms of new initiatives, we have several ideas in mind. We are close to launching a new Enterprise Investment Fund targeted to help defray the start-up costs of new technology companies with high growth potential. The state is able to make investments in the range of $150,000 to $250,000 in return for an equity stake in the new enterprise.

We are also strongly considering investing in Small Business Investment Companies given the recent federal amendments. We are particularly interested in increasing the availability of follow-up financing for venture-backed companies and investments in companies that are not likely to go public.

Another key initiative receiving attention in Maryland is supporting pre-start-up management assistance for growing high quality technology companies that are commercializing block-buster research discoveries. The pre-start-up assistance would offer a range of support, including marketing analysis, management support, access to laboratory facilities and early-stage seed financing to bring the nascent firm to the point where it is able to attract traditional equity funding.

Implications for the Federal Government

The Federal government has played an important role in product development through the Small Business Innovation Research (SBIR) program and the Cooperative Research and Development Agreements (CRADAs). Our experience in Maryland is that the Small Business Innovation Research program has been an important source of product development financing. The recent increases in the SBIR program should pay enormous dividends to the nation. Many Maryland companies are also involved in CRADAs which are used to commercialize research discoveries in federal laboratories. We are concerned, however, that CRADAs are beyond the reach of our smaller companies because they lack the financial resources to collaborate with federal laboratories.

I think it is important to recognize that the private market place will not sufficiently invest in the product development and start-up phase of technology company development because of the significant unanswered questions concerning the business. This gap has only grown wider in recent years with the increasing need in the venture capital industry to demonstrate quick returns to shareholders and limited partners. Commercial lenders in technology lack the well developed appraisal, valuation and collateral security system evident in real estate and equipment transactions. Some lenders, like the Silicon Valley Bank, have developed market niche expertise. But the gap between the need for commercial banking support of technology businesses and bank expertise is widening.

Our experience in Maryland suggests that it makes sense for the Federal government to take an equity stake in companies it assists. Not doing so, deprives the Federal government an important market check on whether the recipient is focused on being a viable company. It also means significant revenues are not captured that can help expand future efforts.

Up until now, however, the Federal initiatives that support product development have been on a company-by-company basis. This limits the leverage of Federal efforts. With the changes in the Small Business Investment Company regulations, we are hoping that new self-supporting financing entities focused on product development can be created that can have a long-term economic impact on communities.

It may be that as new Federal product development and seed initiatives are developed, which are able to take an equity stake, that they be used in a manner that creates new economic development entities able to sustain a pipeline of new companies, rather than take a one-by-one assistance approach. This can be a significant way for states and the federal government to collaborate together, so the benefits of successful product development can be used to support future product development.

One last word on SBICs. The recent changes permitting state investment in SBICs is a very welcome one. It provides an important outlet for state concerns on how to create non-traditional financing for technology companies. And, through the federal matching, it creates a powerful state-federal partnership. However, for states to be active participants in the program, we need to treat states like we would any other investor and ensure it has rights in the governance in the SBIC.

States have been operating independent financing authorities for decades. They are insulated from political pressure, but not above public accountability. If states are going to invest in SBICs, which we believe is in their best economic interests, they cannot do so without being able to have the full rights as investors in terms of shaping the management of the SBIC. Currently, we are being told that state money in SBICs is welcome, but state involvement as investors is not welcome.

HOUSE BANKING, FINANCE AND URBAN AFFAIRS COMMITTEE
SUBCOMMITTEE ON ECONOMIC GROWTH AND CREDIT FORMATION

Roundtable Hearing
November 16, 1993

STATEMENT OF
WILLIAM E. WETZEL, JR., DIRECTOR
CENTER FOR VENTURE RESEARCH
UNIVERSITY OF NEW HAMPSHIRE

Good morning Mr. Chairman and Members of the Subcommittee. I am Bill Wetzel, Director of the Center for Venture Research at the University of New Hampshire. Thank you for the opportunity to meet with you today to explore the Federal government's role in the financing of technology-based business development.

My remarks highlight issues that I believe will be useful in your development of effective public policy. They are in two parts. Part I deals with six misconceptions that could lead to inappropriate public policy. Part II presents my suggestions for Federal initiatives designed to enhance the availability of financing for technology-based companies.

PREFACE

The structure of the U.S. economy passed a milestone of transcendental importance in 1979.

Between 1958 and 1979, the share of business receipts generated by companies with less than 500 employees fell from 52% to 29% of the total for all American companies. From 1954 to 1979, the share of GNP represented by the Fortune 500 grew from 37% to 58% and political economists were concerned about a "new industrial state" dominated by large firms.

From 1979 to 1992, Fortune 500 employment dropped by 25%, from a 1979 peak of 16 million to under 12 million in 1992. From 1979 to 1992, the invisible entrepreneurial segment of the economy generated 20 million new jobs.

The "atomization" of America that began in the sixties and seventies is now a fact of economic life and has significant implications for public policy aimed at economic development. However, before effective public policy can be designed, we must first dispel what I believe to be serious misconceptions about the process that has been unfolding over the last twenty years.

PART I

MISCONCEPTIONS

MISCONCEPTION #1

SMALL BUSINESS IS THIS COUNTRY'S JOB GENERATING ENGINE.

Since 1979, Over 75% of net new jobs were created by about 8% of small businesses. Job-generating businesses are started and driven by entrepreneurs, not small-business men and women. The distinction is critical to any discussion of financing technology-based ventures. For entrepreneurs size is a transient characteristic. Innovation, change, risk-taking and growth distinguish entrepreneurial ventures from other small businesses. The entrepreneurial segment of the small business population includes about 50,000 start-ups per year and 500,000 existing ventures growing at annual rates in excess of 20%, including about 80,000 growing faster than 50% per year.

MISCONCEPTION #2

ACCESS TO CREDIT IS THE MAJOR FINANCIAL OBSTACLE TO JOB CREATION.

Access to equity capital is the major financial obstacle to job creation. The problem is particularly acute for early-stage ventures needing high-risk, patient, value-added capital, i.e. venture capital. In addition, established ventures growing over 20% annually typically require new equity financing to supplement internal cash flows.

The business history of the United States is the history of equity financing. The job-generating entrepreneurial segment of the economy needs about $60 billion per year of high risk, patient, value-added capital. Sixty billion is equivalent to about one half day's trading in the U.S. Treasury market and about one week's trading on the NYSE. Annually, venture capital funds invest about $2 billion in about two thousand ventures and self-made, high net worth individuals (business angels) invest over $10 billion in over thirty thousand ventures. Entrepreneurs face a $45 billion annual equity financing shortfall. THIS IS OUR COUNTRY'S REAL CAPITAL FORMATION CHALLENGE.

MISCONCEPTION #3

VENTURE CAPITAL COMES FROM THE VENTURE CAPITAL FUNDS LISTED IN PRATT'S GUIDE TO VENTURE CAPITAL SOURCES.

This misconception results from the fact that there are two segments to the venture capital markets - one visible and one invisible. The visible venture capital market is composed of over 500 venture capital funds that manage about $35 billion, not a lot of capital in the grand scheme of things. It is equivalent to the total assets of one good-sized bank, the Bank of Boston for instance. These funds are listed in Pratt's Guide to Venture Capital Sources.

Venture capital funds invest $2-$3 billion annually in entrepreneurial ventures. Every business day more than $2 billion changes hands before noon on the floor of the New

York Stock Exchange. Venture capital funds bankroll less than two thousand companies per year and two thirds of these financings are for ventures already in their portfolios.

The invisible venture capital market is the oldest and the biggest. It is made up of about two million self-made, high net worth individuals - individuals with substantial business and entrepreneurial experience. They are often referred to as "business angels." The 1970's and '80's spawned a huge choir of angels. Their know-how and their capital are two of this country's least understood and underutilized economic resources.

There is no Pratt's Guide to Angels and no public records of their investment transactions. Best estimates of the scale of this invisible, informal venture capital market suggest that about 250,000 angels invest $10-20 billion every year in over thirty thousand ventures. More importantly, angels have a much higher propensity than venture capital funds to provide the crucial smaller rounds of seed and start-up financing required by early-stage ventures.

Angels are investing in the farm system that spawns new technology-based firms. The following data were collected by the Center for Venture Research from 284 new, technology-based firms (NTBFs) founded in New England between 1975 and 1986: (See "Who Bankrolls High-Tech Entrepreneurs?," J. Freear & W. Wetzel, Journal of Business Venturing, March, 1990)

ROUNDS INVESTED IN NTBF'S

Size of Round	Private Individuals		Venture Capital Funds	
<$250,000	102	(58%)	8	(5%)
$250,000-$499,999	43	(24%)	14	(8%)
$500,000-$999,999	15	(8%)	31	(18%)
≥ $1,000,000	17	(10%)	120	(69%)
Total	177	(100%)	173	(100%)

ROUNDS INVESTED IN NTBF'S

Stage	Private Individuals		Venture Capital Funds	
Seed	52	(29%)	11	(6)
Start-up	55	(31%)	38	(22%)
First Stage	29	(16%)	56	(32%)
Second Stage	26	(15%)	46	(27%)
Third Stage	10	(6%)	19	(11%)
Bridge	5	(3%)	3	(2%)
Total	177	(100%	173	(100%)

The median size a round of seed, start-up, and follow-on financing from angels was $150,000, $150,000, and $200,000 respectively. The median size of a round of seed, start-up, and follow-on financing from venture capital funds was $450,000, $1,500,000, and $2,000,000 respectively. The conclusion: angels and venture capital funds play complementary, not competing, roles in the financing of new, technology-based firms.

MISCONCEPTION #4

ALL VENTURE INVESTORS ARE EQUALLY VENTURESOME

They are not. The risks involved in bankrolling early-stage ventures are many orders of magnitude greater than the risks inherent in later-stage investing. In addition to entrepreneurs themselves, business angels turn out to be the real venture capitalists. In the Tables above, early-stage investing accounted for 60% of angel deals compared to 28% of rounds from venture capital funds. During the 1980's the percentage of early-stage venture capital fund deals fell to under 10% for well under one thousand companies. (See Venture Capital at the Crossroads, W. Bygrave & J. Timmons, Harvard Business School Press, 1992)

MISCONCEPTION #5

LIMITED ACCESS TO CREDIT IS THE MOST SERIOUS FINANCIAL OBSTACLE CONFRONTING HIGH-GROWTH ESTABLISHED FIRMS

For high-growth established firms, credit constraints typically result from an inadequate equity capital base. Profitable growing firms without access to the public equity markets depend upon retained earnings and internal cash flows to finance growth and to provide the growing equity base required to command additional credit accommodations. Firms growing at rates in excess of 20% per year typically are unable to generate sufficient retained earnings and cash flows to support sustained growth. The more rapid the rate of growth, the more severe the equity and cash flow problems become.

MISCONCEPTION #6

CAPITAL GAINS TAXES ARE A TAX ON THE WEALTHY.

Capital gains taxes are a tax on the creation of wealth - a tax on creative risk-taking, the creation of jobs, innovation, and new technology-based companies - America's real competitive edge. Venture investors and entrepreneurs earn their rewards for risk-taking from capital gains. As opposed to venture capital funds, virtually all private investors are subject to capital gains taxes.

The 50% reduction in taxes on capital gains earned on investments in entrepreneurial ventures held five years or longer is the Clinton administration's most promising effort to date to enhance the availability of equity financing for entrepreneurs.

PART II

PUBLIC POLICY RECOMMENDATIONS

The allocation of scarce financial resources to their most productive uses requires efficient capital markets. To function efficiently capital markets require fully informed buyers and sellers of capital and minimal transactions costs.

The invisible market for angel financing is not an efficient market. In my judgement, there is more than enough know-how and capital in the heads and the pocketbooks of self-made, high net worth individuals to meet the equity financing needs of technology-based entrepreneurs.

The challenge we face has four dimensions: 1) acquire a significantly greater understanding of the attitudes, behavior and characteristics of business angels (self-made, high net worth investors in entrepreneurial ventures), 2) provide angels and potential angels with convenient access to relevant information about opportunities to invest in technology-based ventures, 3) provide entrepreneurs and angels with convenient access to the know-how required to intelligently price and structure a venture investment (the "central mystery" of venture capital), and 4) alert potential angels to the opportunities to prudently invest a fraction of their net worth and their know-how in entrepreneurial ventures.

In my opinion, the Federal government can earn the biggest return on its policy investment by undertaking initiatives that significantly enhance the efficiency of the private equity capital markets that serve entrepreneurs.

RECOMMENDATION #1

Raise the rewards for early-stage investing by reviving the seed capital provision of the 1993 Enterprise Capital Formation Act (S. 368) introduced by Senator Bumpers and others in the last session of the Congress. The seed capital provision reduced the capital gains tax from 50% of the normal rate to zero for seed capital investments in firms with aggregate capitalization under $5 million when those investments are held for ten years or more. The rate would drop in 10% annual decrements for investments held beyond the current five-year threshold.

RECOMMENDATION #2

Provide the seed capital required to create a more efficient market for private venture financing. Financial self-sufficiency should be one of the goals of such an investment. The following initiatives are recommended:

1) Fund a nationwide study substantial enough to form statistically valid conclusions about the attitudes, behavior and characteristics of angels and the scale of the angel market. This is an invisible market, despite its apparent size. The better we understand this market, the better we can fix it.
2) For the next three years, underwrite the operating expenses of existing venture capital networks that "make a market" for angel financing. The Technology Capital Network at MIT is the leading example of venture capital networks. These not-for-profit organizations are in the information business and have proven their effectiveness, but they are starved for capital to promote their services and to implement up-to-date information management technology. This recommendation is consistent with Vice President Gore's vision of a national information highway and with the Clinton administration's activist approach to promoting the commercialization of technology.

3) Provide the seed capital to fund MIT's plans to create a national "technology capital network." Federal research laboratories and the country's leading research-based universities would be key partners in such a network.
4) Underwrite the cost of developing educational materials that will raise entrepreneurs' and angels' level of confidence and competence in their ability to price and structure venture investments. This recommendation is designed to reduce the transaction costs of venture investing.
5) For the next three years, underwrite venture capital networks' marketing costs to alert potential angels to entrepreneurial investment opportunities and to the prudence of investing their know-how and a fraction of their net worth in promising ventures. Increasing the number of active angels from 250 thousand to 1 million (about half of the two million self-made millionaires in the U.S.) should be a major policy objective for dealing with our "real capital formation challenge."

RECOMMENDATION #3

Minimize obstacles to the internal financing of high-growth established firms by providing a Growth Tax Credit equal to the percentage rate of growth in sales over the previous year. A Growth Tax Credit would have the following characteristics:

1) A tax credit keyed to growth makes a powerful statement about Federal policy affecting our country's most dynamic small firms.
2) The size of the credit is tied automatically to the size and the timing of the cash flow requirements of high-growth firms.
3) The credit relies on the marketplace to determine the beneficiaries and is not targeted to any business or industry sector.
4) The credit is a public investment in the future tax base and employment base of the country.
5) A growth tax credit is easy to understand and administer.
6) Investment decisions are based upon risk/reward expectations. A tax credit that rewards performance would be no less effective than traditional front-end incentives for investment. By only benefitting the "winners," the impact on tax revenues would be a fraction of front-end incentives.

CONCLUSION

Mr. Chairman and members of the Subcommittee, this concludes my remarks. I appreciate the opportunity to meet with you today and look forward to opportunities to work with you to enhance the availability of financing for our country's technology-based companies.

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December 14, 1993

Paul E. Kanjorski, Chairman
Subcommittee on Economic Growth and Credit Formation
Committee on Banking, Finance and Urban Affairs
109 Ford Office Building
Washington, DC 20515-6054

Dear Chairman Kanjorski:

With care and great interest, I read H.R. 3550 and the supporting materials that you forwarded to me. I applaud your efforts to promote the availability of financing for high-technology companies.

As you explore opportunities to overcome the financing obstacles confronting new, technology-based companies, I urge you to examine their need for patient, value-added, high risk equity financing, i.e. venture capital, especially at the seed and start-up stage. Our research has led us to the conclusion that limited availability of equity capital for high potential ventures is more critical than limited access to credit.

We have also reached the conclusion that this country's self-made, high net worth individuals (business angels and potential angels) have more than enough know-how as well as capital to bankroll the start-up of the next generation of high-tech entrepreneurs. The bottleneck seems to be the result of inefficient markets for angel financing rather than insufficient capital or investor interest. By investing in more efficient private markets for early-stage equity investment in high-tech ventures, I believe the multiplier effect from the commitment of public dollars could well be in the neighborhood of five hundred or more. Low cost and enormous benefits account for the huge multiplier effect.

To supplement my November 16th testimony before your Subcommittee, I am enclosing a copy of my February 25, 1993 letter to Larry Light, Corporate Finance Editor of Business Week. If you have an interest in exploring public policy designed to mobilize angel know-how and capital, I would welcome the opportunity to work with you and your staff.

Best regards.

Very truly yours,

Wm. E. Wetzel, Jr.
Director

WW/sb

enclosure

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February 25, 1993

Larry Light
Corporate Finance Editor
Business Week
McGraw-Hill Building
1221 Avenue of the Americas
New York, NY 10020

Dear Mr. Light:

The one-line last paragraph of your Commentary, "Small Business: The Job Engine Needs Fuel," in the March 1, 1993 issue is right on the mark, but the analysis and prescriptions in the body of the Commentary are way off the mark.

To understand the kind of fuel the job engine needs, one must distinguish between "small business" and "entrepreneurial businesses." For the latter, size is a transient characteristic, not a distinguishing characteristic. The job generating power of small business is driven by entrepreneurial ventures - less than 10% of all small businesses. They are the "nimble, entrepreneurial, and innovative" 13% in the December NFIB survey who plan to expand employment in 1993.

The financial obstacle these high-growth private companies and high-potential start-ups face is not trouble getting money from banks and insurance companies. They need access to patient, high-risk equity financing - the capital base that supports the debt financing you prescribe.

It appears to me that you suffer from the common misconception that small businesses and entrepreneurial businesses are one and the same. They are not! Your prescriptions are valid solutions to the capital problems of 90% of small businesses - those that, for whatever reason, are not the job generating entrepreneurial ventures.

President Clinton's proposal to reduce the current 28% capital-gains tax on minimum five-year investments in companies with less than $25 million in capital is no "misfire." This is where you really miss the core issue. Small businesses prefer debt. Entrepreneurs want and need outside equity capital.

You and Business Week are in a position to influence the course of economic events. It is my sincere hope that you will take the time to understand the distinction between small business in general and entrepreneurial ventures in particular. The former need debt financing. The latter need patient, high-risk equity capital - the kind of capital provided by the venture capital industry and especially by business angels (self-made, high net worth private investors), an invisible segment of the venture capital markets.

In the hope that I have evoked in you a need to know more about the feeding of entrepreneurs, I am enclosing two documents. The first is a set of notes prepared last December for the Presidential Transition Team. The second is an article submitted last week to the Editor of the Harvard Business Review.

Very truly yours,

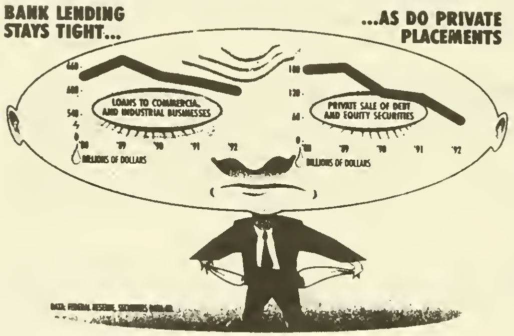
Wm. E. Wetzel, Jr.
Director
Forbes Professor of Management

Commentary/by Larry Light

SMALL BUSINESS: THE JOB ENGINE NEEDS FUEL

Small and midsized companies are America's secret economic weapon—nimble, entrepreneurial, and innovative. These incubators of growth created 80% of the jobs in the 1980s. That's why helping small business is a key part of the economic package that Bill Clinton unveiled on Feb. 17.

There's just one problem: Small business may not be up to the task. According to a December survey by the National Federation of Independent Business, only 13% plan to expand employment in 1993, and 10% plan reductions. The main obstacle is that small companies are having lots of trouble getting money from their traditional sources—banks and insurers. Despite the economic recovery, bank loans are way down from 1989, and insurer-provided private placements, which usually go to smaller fry, are even worse (charts). The recovery may bring more lending, but not enough.



DATA: FEDERAL RESERVE, SECURITIES DATA CO.

RAY VELLA/BW

TOO SAFE. Look at Amlack Inc., a Newark (N.J.) chemical company now shuttered for want of capital. In 1991, after 10 years in business, Amlack closed to retool, which would have allowed it to double its 50-person work force. But then the company's lender failed, and Amlack so far has been unable to get replacement financing. Meanwhile, the company is "dormant," laments Amlack's investment adviser, Anthony L. Alaimo of Coloney Von Soosten & Associates Inc. in Tallahassee, Fla.

Who's to blame? Many people cite stultifying government regulation, a belated response to the 1980s' bacchanal. The Clinton Administration is exploring ways to relax the regulatory burden. All the whining from banks and insurers about a heavy regulatory hand, though, is vastly exaggerated.

The truth is that many U. S. financial institutions, burned by bad loans during the 1980s, have grown too cautious for everybody's good, including their own. Banks would rather make loans to big corporations or simply dine out on the difference between paying 3% for a certificate of deposit and collecting 6% from a medium-term Treasury. In other words, they prefer to fund the federal deficit rather than nurture job-generating small private enterprises that will benefit them and society in the long term.

Banks did make lots of bum loans last decade, but most of the losses involved real estate ventures, not small companies. Indeed, it's possible to make splendid returns on loans to these companies. Good object lessons are available from the handful of investment boutiques, such as New York's Castle Harlan Inc., that focus on financing companies with annual revenues of $150 million or so. The payoff can be handsome, with internal rates of return north of 25% yearly.

Sadly, there aren't enough investment boutiques to make a difference. Castle Harlan's new fund has a mere $250 million to invest. Venture-capital outfits, which historically fund the dinkiest outfits (with annual revenues up to $10 million), last year committed only $2 billion.

Clinton's proposal to reduce the current 28% capital-gains tax on minimum five-year investments in stripling companies—those with less than $25 million in capital—is a misfire. Sure, lowering the levy might trigger some new financing. Trouble is, few businesses that tiny want or need outside equity capital; their owners prefer debt, which doesn't dilute their stake. This proposal will only help them if they sell after five years, not at the start, when they most need money. Besides, why undo the 1986 tax reform, which was all about removing the economic distortion of special tax incentives?

There are plenty of more effective moves the government could make. One is to start a Federal National Mortgage Assn. for small business, which could spur fresh lending to corporate runts by packaging bank loans into securities and selling them to investors. Another good idea: increase the volume of loans guaranteed by the Small Business Administration.

PENSION KITTIES. Although red-tape slashing is no cure-all, the Administration should at least call the banks' bluff and deal with genuine impediments that get in the way of worthy lending. The same goes for state insurance regulators. Two-year-old restrictions on medium-grade private placements, which require insurers to post overlarge reserves as a safeguard, should be relaxed. Default rates for medium-grades are pretty low anyway.

Another ripe area for potential investment capital is pension funds. Much of their billions now is invested in ultrasafe Treasuries. Unfortunately, many have internal rules limiting more speculative investments to a mere 5% of assets. Fund sponsors should relax these restrictions immediately. Considering pension funds' awesome kitties, an additional 5%—or $130 billion—would provide plenty of bread.

In the nation's incubators of growth, feeding time is overdue.

Larry Light is corporate finance editor of BUSINESS WEEK

STATEMENT

on
Equity Investments, Venture Capital and the Federal Role in the Availability of Financing for High-Technology Companies

Presented to

Subcommittee on Economic Growth and Credit Formation
Committee on Banking, Finance and Urban Affairs
U.S. House of Representatives

November 16, 1993

by

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Mr. Chairman and members of the Subcommittee on Economic Growth and Credit Formation:

Thank you for the invitation to testify today on equity investments, venture capital and the federal role in the availability of financing for high-technology companies. My name is Thomas H. Stanton. I am a Washington, DC attorney and a specialist in laws relating to federal credit programs and federal enterprises. I am a Fellow at the Center for the Study of American Government at the Johns Hopkins University, where I will teach a graduate seminar on the laws of public institutions. Also, I help to teach the annual seminar on government enterprises conducted by the National Academy of Public Administration. My writings on government corporations and government sponsored enterprises include a book, A State of Risk (HarperCollins, 1991) and many articles.

In my legal practice, one client has been the Institute of Electrical and Electronics Engineers, Inc. (IEEE-USA), for whom I have prepared the legal framework of a government corporation to provide long term loans in support of high technology manufacturing in the United States. In this statement and my testimony today I am speaking solely for myself and not for any client or other institution with which I am affiliated.

This statement will address the institutional choices available to the federal government when it seeks to provide credit support of the kind envisioned by this subcommittee. Because of its focus upon institutional structures, the statement devotes special attention to the October 22 version of the draft legislation called the "Federal Technology Commercialization and Credit Enhancement Act of 1993" and suggests possible alternative approaches.

I greatly appreciate the thoughtful approach of the subcommittee and its circulation of the draft legislation at such an early stage of its deliberations. This approach permits commentators to have timely input into arcane but possibly important issues such as are addressed here.

This statement presents two major points:

- There are significant complications involved in trying to create a hybrid federal-private corporation; the federal government can avoid some of those difficulties by creating a government corporation to fund high technology companies and facilitate commercialization of government licenses and patents.
- The federal government can provide long term debt financing without creating the significant complications that are involved in trying to authorize federal equity investments in private companies.

I. The Complications Involved in Using a Private Company to Administer Federally Appropriated Funds and Dispose of Federal Licenses and other Commercial Assets

A. The Institutional Structure of the Proposed Technology Transfer and Commercialization Financing Corporation

The draft legislation proposes creation of a federally chartered corporation to be known as the Technology Transfer and Commercialization Financing Corporation. The corporation would facilitate the transfer and commercialization of federal patents, licenses, processes and technologies. It would provide financing, through loans and equity investments, to eligible concerns for the purpose of promoting transfer and commercialization of the federal patents, licenses, processes and technologies.

The proposed corporation would attempt to combine federal funding with private management. Private parties would own forty percent of the stock of the corporation and would have all voting rights. The federal government would own a sixty percent stake in the company in the form of nonvoting equity. The corporation would be managed by a completely private board of directors elected by the private stockholders. The corporation would administer a Technology Transfer Investment Fund that the legislation would establish in the Treasury of the United States. The legislation would authorize appropriations of $3 billion each year for five years, to be available to the corporation without regard to fiscal year limitations.

B. Analysis of the Proposed Structure

In the past, and especially in the early years of this nation, there have been a number of occasions when the federal government has provided needed equity capital to a privately managed company as a way to serve important public purposes. However, for the public purposes intended to be served in the Federal Technology Commercialization and Credit Enhancement Act, recent history does not provide a promising precedent for this approach.

While not identical, the institutional framework and corporate purposes envisioned under this draft legislation resemble those of the Federal Asset Disposition Association (FADA). FADA was an institution authorized by the Federal Home Loan Bank Board (FHLBB) to assist the federal government in disposing of assets from failed savings and loan associations. Like FADA, the proposed Technology Transfer and Commercialization Financing Corporation would combine federal equity with private management. (Two distinctions should be noted: the government owned one hundred percent rather than sixty percent of FADA equity; also, FADA was ultimately controlled by the FHLBB rather than by a board elected by private shareholders. The following comments should be considered with those distinctions in mind).[1]

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[1] Also, the proposed legislation avoids the serious problem that occurred when the FHLBB/FSLIC attempted to establish FADA without first obtaining express congressional authorization. See Hon. Paul E. Kanjorski, "FADA Illegally Established," Congressional Record, April 21, 1988, pp. E1185-86 (daily

Like FADA, this corporation would be free from many of the staffing and budgetary controls that contribute to the inflexibility of some governmental institutions.[2] Like FADA, this corporation would be authorized to pay private-sector compensation to its officers and employees and could hire and fire them at will. Like FADA, the mission of this corporation would be to place federally owned assets into private commercial use. In the case of FADA, those assets were the holdings of the Federal Savings and Loan Insurance Corporation (FSLIC) that had been obtained from insolvent savings and loan institutions; here the assets consist of federal patents, licenses, processes and technologies.

Even though FADA involved different kinds of federal assets and public purposes than are involved in the legislation here, the incentives created by the new legislation can be foreseen. First, like FADA, the well-compensated employees of the corporation will need the cooperation of federal officials to carry out their commercialization activities. This could well raise frictions such as occurred between the well compensated

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edition). By contrast, the legislative proposal here would involve congressional enactment of the authorizing legislation as well as congressional appropriations of funds used to provide financing.

[2] The report of the National Performance Review, conducted under the auspices of the Vice President of the United States and published on September 8, 1993, is only one of many federal and private sector reports that document laws and regulations that restrict the flexibility and capacity of government agencies.

employees of FADA and their less-handsomely paid federal counterparts at the FSLIC.

Second, as happened to FADA, the private disposition of federal assets and the provision of special financing to private parties could well invite congressional scrutiny, and potential second-guessing of decisions of the corporation. The Congress would be at liberty to amend the enabling legislation of the corporation any time that influential members are not satisfied with the corporation's immediate performance. Indeed, as with FADA, the Congress would be free to repeal the corporation's authorizing legislation at any time, presumably with due regard to the interests of the private shareholders in this case. Such public scrutiny, similar to oversight of governmental bodies, is quite different from the environment that permits managers of the usual private company to make and implement decisions, and even to take risks and make mistakes, without threat of public embarrassment and potential sanctions at the first sign of adversity.

Finally, the proposed Technology Transfer and Commercialization Financing Corporation raises an important issue of federal budgeting that must be addressed. The 1967 President's Commission on Budget Concepts published a report that governs the federal budget treatment of government corporations, government sponsored enterprises and other entities created under federal law. The Commission report specifies that the activities of such entities shall be included in the federal budget unless the entity is "completely privately owned."[3]

The federal government has taken the budget concepts report quite seriously. As a result of its publication, the federal government divested itself of partial ownership of some institutions of the Farm Credit System and also sold its stake in the secondary market operations of Fannie Mae (the Federal National Mortgage Association) to private owners.[4]

The implications of this federal budget principle for the proposed corporation are straightforward: federal ownership of a sixty percent stake in the technology transfer corporation is likely to require that all of the operations of the corporation be placed on the federal budget and that its activities be subject to the federal budget process and control by the Office of Management and Budget. Again, this is a significant departure from the flexibility of a private corporation that may have been envisioned by the drafters of the proposed legislation.

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[3] Report of the President's Commission on Budget Concepts, (Washington, DC: GPO, 1967), p.30.

[4] With respect to Fannie Mae, see, Richard W. Bartke, "Fannie Mae and the Secondary Mortgage Market," Northwestern University Law Review, Volume 66, Number 1, (March-April 1971), at pp.30-32.

II. The Complications Involved in Federal Ownership of Private Companies

The proposed Technology Transfer and Commercialization Financing Corporation would be authorized to use appropriated federal funds to make nonvoting equity investments in qualified concerns, including private companies. Again, this raises some issues. First, although it does provide for regulations by the Secretary of Commerce, the draft legislation establishes few standards for choosing among companies; that means that the corporation may be free to exercise considerable discretion in allocating scarce federal funds among many business that may desire such funds. Such discretion in turn invites the kind of congressional and public scrutiny discussed earlier. Indeed, businesses are likely to turn to the Congress whenever they feel aggrieved by what they perceive to be an unjust decision by the corporation to deny them funds or, worse, to give those funds instead to one of their competitors.[5]

Second, the investment of federal funds in a private business may involve concerns that were raised by the 1967 President's Commission on Budget Concepts. There is some prospect that the federal equity investments, although channeled through the federal corporation, would result in placing operations of those private companies within the federal budget as well. Here the conclusion is less clear than with respect to the budgetary treatment of the Technology Transfer and Commercialization Financing Corporation. As the President's Commission itself noted, the process of drawing budgetary distinctions is not completely free from ambiguity and doubt.[6] The Office of Management and Budget is likely to play a role in deciding this issue.

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[5] The College Construction Loan Insurance Association (Connie Lee) is one of the few private companies in which the federal government has made an equity investment in recent years. Connie Lee has aroused considerable controversy among private competitors that do not benefit from a federal contribution to equity capital. See, Paul Starobin, "Connie's Prizefight," National Journal, June 26, 1993, pp. 1642-1645.

III. Suggestions About Possible Approaches to Achieve the Subcommittee's Purposes

There are ways to serve the goals intended by this subcommittee while avoiding the issues that have been raised. The most important first step is to distinguish those activities that should be the responsibility of a governmental institution from those that are the responsibility of private parties. The sale of government patents, licenses and other assets is the responsibility of the government that owns them. Similarly, the provision of federally appropriated funds to qualified high technology companies is, initially at least, a governmental responsibility.

Thus, creation of a wholly owned government corporation appears to be a superior alternative to creation of a hybrid corporation that tries to combine public ownership with private management. Such a wholly owned government corporation would be similar in statutory structure and accountability to other agencies such as Ginnie Mae (the Government National Mortgage Association) or TVA (the Tennessee Valley Authority), that have served important public purposes for many years.[7]

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[6] Report of the President's Commission on Budget Concepts, at pp.24-25.

This said, one hastens to add that--especially with the reductions in the federal workforce urged by the Clinton Administration--it is entirely appropriate for such a government corporation to contract out many of its operations to private parties. Many government corporations today contract out activities while retaining responsibility for final quality. The important concern is to assure that the government corporation has the capacity to carry out its public purposes and to hold any third parties properly accountable to the government corporation and ultimately to the Executive Branch and the Congress.[8]

The second important step is to provide federal financial support for commercialization without raising the issue of government ownership of private competitors in the marketplace. This can be done by providing long-term financing in the form of debt rather than equity ownership. Such debt financing is authorized by the draft legislation. Today's financial wizards are likely to be able to help the government to fashion particular forms of long term debt financing to achieve quite similar purposes to those that can be served by providing equity.[9]

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[7] A good overview of the principles governing establishment and operation of government corporations is found in National Academy of Public Administration, Report on Government Corporations, (Washington, DC: National Academy of Public Administration, 1981), Vol. I. See also Harold Seidman and Robert Gilmour, Politics, Position, and Power, fourth edition (New York, NY: Oxford University Press, 1986), chapters 11 and 12.

[8] See, John J. DiIulio, Gerald Garvey and Donald F. Kettl, Improving Government Performance, (Washington, DC: Brookings Institution, 1993), pp. 33-37. The issue of sufficient staffing and capacity is one that needs to be addressed for a number of government corporations today. See, for example, US General Accounting Office, Government National Mortgage Association: Greater Staffing Flexibility Needed to Improve Management, (Washington, DC: June 1993).

* * * * * *

In conclusion, then, the purpose of this testimony is to invite the subcommittee's attention to institutional issues relevant to commercialization of federal technologies and the use of federal funds to support high technology companies. As the House Banking Committee itself has experienced with hybrid entities such as FADA, clear lines of accountability between governmental and private institutions serve important purposes. Proper design can help to assure that institutions created by act of Congress can serve their important public purposes over many years while bringing credit to the committees and subcommittees that create them.

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[9] This is especially true for the draft legislation. That proposal authorizes federal financing solely as a means of promoting the commercialization of federal patents and technologies. Thus, the federal government may be able to recapture equity-type returns in the sale or lease price of the federal patents or technologies rather than as a return on ownership of stock in the company that buys or licenses the technology. The net result in financial terms could be comparable to federal returns on an equity investment, but without the problems that can arise from federal ownership of private competitors.

STATEMENT FOR THE RECORD

by John T. Preston

Submitted to the Committee on Banking, Finance & Urban Affairs
Subcommittee on Economic Growth and Credit Formation
Paul E. Kanjorski, Chairman

November 16, 1993

I am writing to offer my views regarding the need to increase sources of equity funding for the development of U.S. businesses. This statement is not supporting or opposing any proposed legislation, but reflects personal opinions regarding problems facing this country.

I am Director of Technology Development for the Massachusetts Institute of Technology. In this capacity I oversee programs that help U.S. companies adopt innovative ideas to make their products more internationally competitive; thus creating jobs and wealth in the U.S. MIT has enjoyed remarkable success in spinning off technology, often through the creation of new companies. MIT people have founded many large high tech companies like Intel, Genentech, Digital Equipment and Raytheon. The activities that I direct at MIT are creating the next generation of such high-tech U.S. companies, including American Superconductor, Thinking Machines, Immulogic Pharmaceuticals and Kopin Corp. Many of these companies face a common problem in their inception -- difficulty raising seed venture investments.

As outlined in the attached testimony given before the Space Science and Technology Subcommittee, I believe that, for many industries, there is a shortage of available funding for the middle stages of technology development -- the stages after the Government research funding sources consider the technology too commercial and before industry is willing to adopt the technology. Often our foreign competitors recognize technologies in this funding gap and succeed in beating us to the marketplace. One source of funding in the gap is venture capital. Typically, this source of funding helps entrepreneurs convert research results into products. Thus, making additional funds available for use in venture capital should result in faster technology development and a greater competitive advantage for American companies. The funding shortage is most acute for early stage, "seed" venture investments. Many venture funds have moved away from these early investments as their funds have grown in size. Venture funds that manage large amounts of money with few managers cannot afford the time necessary to do small seed investments. For example, most venture funds with $500 million or more under management will avoid seed investments under $500,000 unless they are collaborating with other funds on a larger overall investment. The irony of this is that the best venture capitalists are the ones that can most easily raise large funds. After raising significant funds these individuals are no longer able to assist small companies with seed investments, where the need is greatest.

Furthermore, the funding shortage is most severe for industries that have tight profit margins such as automotive, utility, and consumer electronic companies. These industries cannot afford long-term, high-risk investments because they are forced by competitive pressures to show short-term results. Likewise, for the reasons sited above, venture capitalists have often shied away from seed investments that would affect these industries. Thus, many excellent inventions in these "mature" fields (mechanical engineering, new materials, power electronics) have difficulty being commercialized in the U.S. On the other hand, younger industries with higher profit margins, such as biotech and media technology have an easier time finding long-term high-risk funding.

To really help this country, we must develop programs that overcome the problems of adopting innovative ideas in our older, big industries as well as the young industries. Increasing venture capital is a step in the right direction, but does not totally solve the problem. Government funded programs such as the Advanced Technology Program, Small Business Innovation Research Grants, and SEMATECH, are also steps in the right direction, but these steps fail to fully address the need. Better methods must be found to stimulate innovation in big (low profit margin) businesses.

If our auto industry had adopted innovative ideas as rapidly as our biotech industry, we would not have a trade deficit. Attached is a paper entitled "National Strategies for Technology Development" that proposes a method for encouraging broad adoption of technology both in small startups and in our large companies.

ADDITIONAL TESTIMONY BEFORE THE ECONOMIC GROWTH SUBCOMMITTEE OF THE HOUSE BANKING, FINANCE & URBAN AFFAIRS COMMITTEE

[reprinted from testimony before the Energy Subcommittee of the
House Space, Science and Technology Committee, March 23, 1993]

November 16, 1993

Thank you for the opportunity to address you today. I am John Preston, Director of Technology Development for MIT and MIT's Lincoln Laboratory (run by MIT for the Department of Defense). I have spent my adult life commercializing technology. I am convinced that this is the best way to improve the American standard of living and to improve our international competitiveness.

As an entrepreneur, I have founded, (or assisted in founding), five companies which have a market value of approximately $.5 billion, two of which are publicly traded. In addition, I head MIT's technology transfer efforts. In the latter capacity at MIT my office and I have helped to create more than 60 companies over the last nine years (Table 1). These companies are worth more than $2 billion, employ more than 2,000 Americans, and are growing rapidly. Thirteen of these companies are now publicly traded.

In addition MIT's Technology Licensing Office negotiates approximately 80 significant licenses each year. My best guess is that this represents more than 20% of all the U.S. university licenses to industry. Last year we filed 180 patents on 450 invention disclosures (two inventions a working day). Fifty-eight percent of MIT patents are licensed to industry within one year of the patent being granted to MIT. About 85% of our licenses go to U.S. owned companies and 100% require significant manufacture in the United States.

KEY PROBLEMS IN COMMERCIALIZING TECHNOLOGY IN THE US

1. Funding Gap

There is a funding gap for technology in the United States. This seems bizarre in a country that spends as much on research as Japan, Germany, France and the UK combined. The U.S. government funds most of this country's early technology development, whereas industry funds the later stages of scaling up the technology into full production. The problem is that there is a lack of funding for demonstrating technologies at small production levels or building the first pilot plant.

The most critical point in technology commercialization is before investors are willing to make risky investments and after government research funding sources consider the project too commercial to fund. Figure 1 shows this gap as the trough in the combined industry and government curve. Much of our technology has languished in this gap, only to be recognized by foreign competitors and developed abroad. U.S. research (in both university and government labs) often generates potential commercial spinoffs that are too embryonic to be adopted by U.S. industry for a variety of reasons:

- the research is generally not directed toward commercial activities, but rather is a spinoff of military missions;
- U.S. companies are generally unwilling to invest in long-term projects for reasons that will be discussed below;
- researchers in academe and government labs often dislike more applied research; and
- there are few sources of funding in this intermediate stage of development.

Small companies and startups have too often been the only ones to jump into this gap with money that they are willing to risk. And make no mistake, this is the riskiest stage of funding in a technology cycle; hence the names "risk" or "venture" capital. "Venture capital" is shortened from its original name, "adventure capital."

One could ask the question: What benefit would occur if the government funded more of the technology development stages? There are some pertinent examples of the U.S. government funding the gap for specific industries.

The government funds medical research across the spectrum of technology development, from basic R&D to human clinical trials to supporting health care for the needy. In addition, firms in young industries also tend to invest over a broader spectrum, further reducing the gap (Figure 2). In the late 1950s the government funded jet aircraft across the spectrum from R&D production. Unlike today's airplanes, these aircraft were nearly identical to the 707s that Boeing produced for commercial applications.

The United States developed worldwide dominance in aircraft in the 1950s that has lasted up to today, just as the U.S. medical products industry is second to none. In most other industries, the government does not fund beyond the R&D level (e.g., consumer electronics, autos, steelmaking, etc.). It seems clear that when the government teams up with academia and industry, and participates throughout the spectrum of technology, the United States becomes dominant in that industry. However, when we fail to fund the gap other countries, such as Japan, will. This often leads to foreign companies successfully commercializing ideas pioneered in this country.

Why MIT has been so successful at technology transfer.

MIT, unlike many universities in this country, was founded on the basis of combining academic studies and applying technology to manufacturing. Since its creation, MIT has embraced interactions with industry and conducted research with potentially practical applications. Thus the spectrum of research is shifted closer to the gap than other universities, (Figure 3). The results in terms of new business creation have been staggering. A study done by the Bank of Boston identifies 636 MIT alumni-founded companies in Massachusetts alone, with revenues in 1988 of approximately $40 billion. Another study identifies 225 MIT spinoff companies in Northern California, with 1989 revenues of $22.5 billion. In addition to creating new companies, MIT has extensive interactions with existing companies, including collaborative research and faculty-consulting relationships.

Spinoff companies are not a new phenomenon. The Bank of Boston study shows that MIT spinoff companies started as early as the 1880s (only 20 years after MIT was founded) with the companies Stone and Webster, Charles T. Main, and Arthur D. Little, which are still thriving today. This trend continued through the 1920s with Raytheon, the 1940s with E.G.&G., the 1950s with Digital Equipment, and it is currently spinning off businesses faster than at any time in its history.

The level of new job creation shown by the MIT spinoff data indicates the importance of encouraging the interaction between industry and our nation's research labs, whether at a university or a government lab. The usefulness to American society of any research is proportional to the interactions between the generators of the technology (e.g., university researchers) and the adopters of that technology (e.g., industry).

How Pacific Rim countries invest in technology commercialization.

I have examined the technology spending of the governments of some of our most aggressive foreign competitors. What we find is a shift in funding to fill the gap (Figure 4). In strategic industries, our foreign competitors can acquire the research results nearly free of charge from the U.S. and U.K. and other countries which fail to fill the gap. We enable the acquisition of research results through our culture of openness - publishing research results and failing to aggressively patent. When we do patent, we often find that foreign competitors are more eager to license the technology than their U.S. counterparts. Exclusive foreign licensing without the requirement to manufacture in the U. S. transfers the value of the technology abroad. As mentioned above, MIT has found ways to succeed in the U.S. We believe that these lessons could be applied to the National Labs.

National Labs have the skills to fill the gap.

The U. S. National Labs have the expertise to apply scientific discoveries to build first prototypes of a product. These are exactly the skills that are needed to fill the gap (Figure 5). During the cold war these skills were applied to prototyping military products and even limited production of military products. Now, we face the challenge of applying some of these skills to U.S. industry.

2. American Industry is too Focused on Short Term Performance

Willingness to fund the risky stages of development (the "gap") is tied more to the ownership of the company than it is to the size of the company. Large companies with significant blocks of shares held by the top management are often willing to invest in developing high-risk technology. A recent study by D. Mark Cunningham of Buck Consultants shows that the stocks of publicly traded companies with "manager-owners" have outperformed the Standard & Poor's 500 tenfold in the last 20 years (Figure 6). These companies are like small companies in that the key decision makers care about the long-term success of the company and not the next quarter's results.

For example, Motorola has one family that owns more than 10% of its shares; that family is actively involved in managing the company. This ownership enables Motorola to more aggressively invest in high-risk, high-payoff technologies, because the family wants to pass the shares on to the next generation and is more interested in optimizing the long-term than the short-term performance.

By way of contrast, General Motors is owned by pension funds and speculators in the stock market. None of these owners thinks of himself/herself as the owner of GM, and all of these owners would sell their shares tomorrow if they thought the shares were going down in value. Companies owned in this way are driven to optimize short-term behavior, which accentuates the funding gap problem.

It is interesting to note that large Japanese companies are owned by banks, not pension funds. The banks have a different orientation than pension funds. They want to maximize the long-term health of the company to be able to maintain their banking relationship. Thus they are much more willing to support wealth-creating investments than short term (wealth-shifting) behavior. In addition, the longer job tenure in Japan and Germany encourages a long-term focus.

Owners who are interested in the long term invest to create wealth, while stock speculators invest to shift wealth. Creating wealth is good for our economy because it creates jobs and international competitiveness, whereas shifting wealth is a drain on our society because it takes funds away from more productive uses. Figure 7 demonstrates this point by showing how sacrificing short-term profitability generates long-term gains. The curve marked "B" is the long-term investor in technology or capital equipment. It shows greater near-term investment to create greater long-term benefits. In the short-term this investment strategy makes less profit than the "A" curve, but the long-term is much more successful.

Managers who are driven by near-term stock market performance will shift investments on the "B" curve to the "A" curve. Such managers will make more money in the short-term from fewer assets and will often be promoted to positions in which they can destroy a bigger chunk of the company.

The United States has more than $2 trillion managed by money managers whose job it is to make money for their clients. Making money can be achieved two ways: by shifting wealth or by generating wealth. Real estate investments are a good example of shifting wealth. The idea behind a real estate investment is simply this: The investor is smarter than others in predicting the future value. However, five years following the investment, the land is still the same as it was when purchased. Thus, if money was made, it was made by shifting wealth.

As a counter example, look at what happens when a new manufacturing business is created. At the end of five years, there are numerous benefits to society: the value of the new products generated, the improvement in efficiency or quality of life of the people who used those products, and the jobs created by the business.

While our money managers invest heavily in manufacturing companies, their investments often have the opposite effect of generating wealth because their focus is on short-term profit. Often, optimizing the short term is accomplished by eating the company's seed corn (e.g., avoiding investing in machinery or research that will keep the company competitive for the next decade), thus reducing its ability to generate wealth.

We should look for tax structures that punish shifting wealth and reward generating wealth.

3. Potential for Conflict

There is a price for economic development. When funds are spent for technology transfer (as in the Small Business Technology Transfer program, Small Business Incentive Research grants and others), there will be greater interaction between government-funded researchers and industry. These interactions often lead to the possibility of personal enrichment. This is generally good for the country because the chance to make money from stock in a startup, or consulting income from an existing company, causes researchers to work more passionately to succeed. This usually means that products get to the market faster and generate more U.S. jobs and wealth.

The problem with such interactions is that occasionally someone will allow greed to bias his or her decisions. When this happens with a university or government employee, there is a potential for conflict. Recently proposed legislation to eliminate the possibility of further conflict (including one proposal that publicly funded researchers should not hold equity in companies commercializing that research) would seriously damage U.S. R&D. Even though it would eliminate a couple of dozen conflicts per year, it would stop the creation of thousands of new jobs. The overreaction would be disastrous, comparable to saying that vaccines should be outlawed because we can prove that for every 100,000 lives saved by a vaccine, one person will have an allergic reaction. It is time that we facilitate positive events rather than let a low-probability evil event keep us from taking action. The only way to avoid conflicts completely is to do nothing. That solution is not economically acceptable.

The U.S. government has the potential to significantly improve the international competitiveness of the country and create domestic jobs. These will be highly-paid, highly-skilled jobs. There is a potential that a few conflicts will be generated by accelerating the interactions between industry- and government-funded researchers, but conflict can be managed, and the good of technology transfer far outweighs the possible negatives. Properly constructed technology transfer programs apply a small amount of money where it has the likelihood to generate enormous benefits.

Figure 1

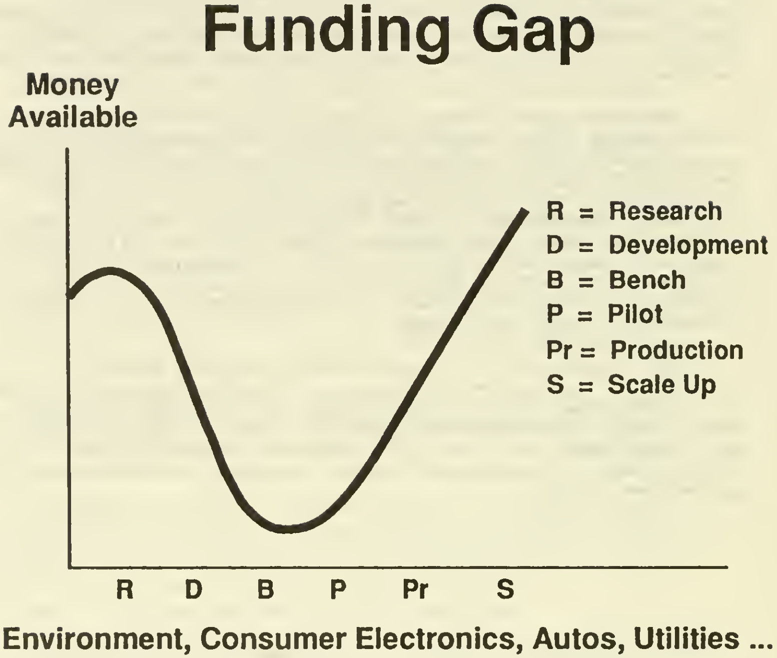
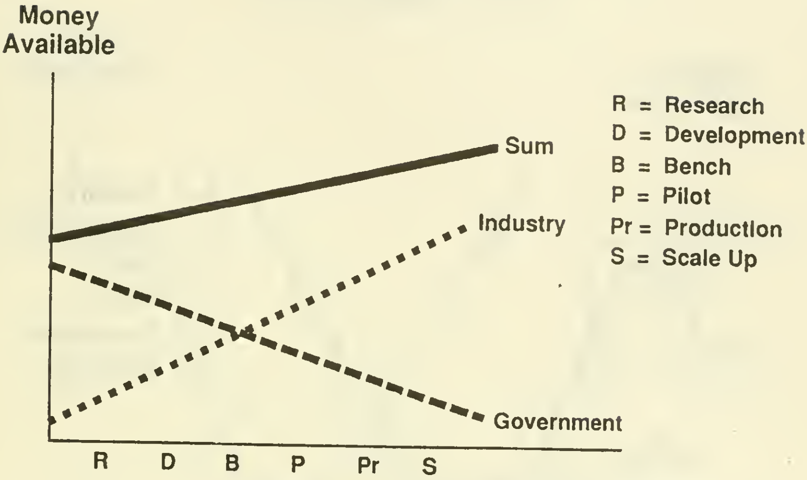

Funding Gap
Money Available
R = Research
D = Development
B = Bench
P = Pilot
Pr = Production
S = Scale Up
R
D
B
P
Pr
S
Environment, Consumer Electronics, Autos, Utilities ...

Figure 2

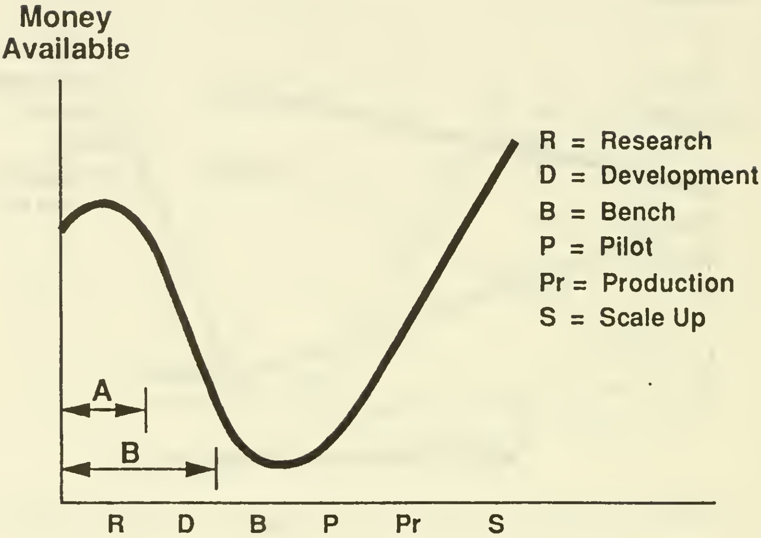
Industries Without Gap



Medicine/Biotech, Aerospace '57

Figure 3

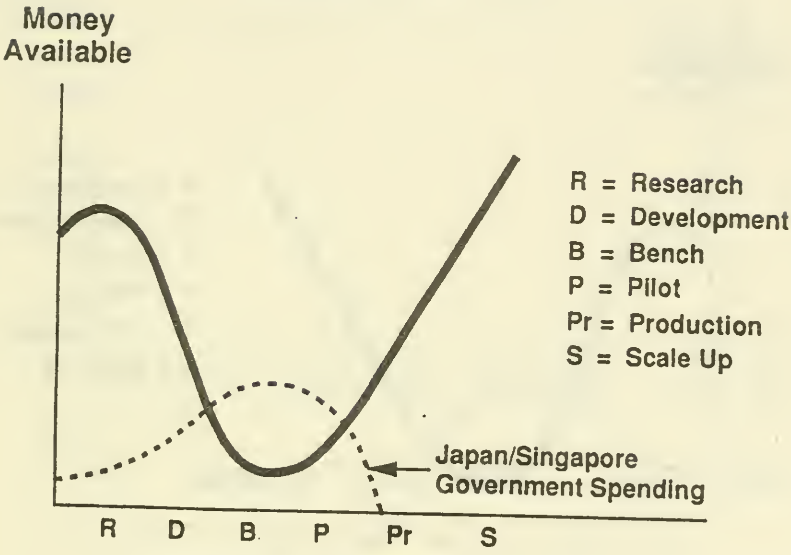
Range of Activity
MIT



A = Range of Most Universities
B = Range of MIT

Figure 4

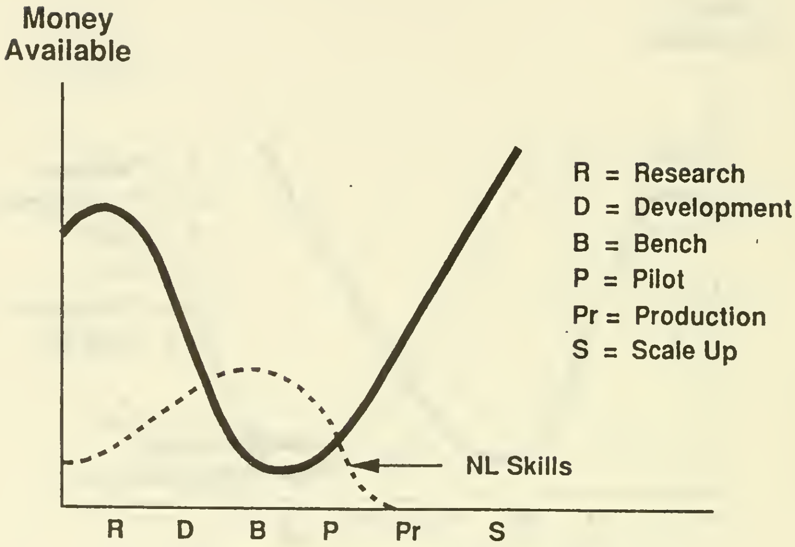
Pacific Rim Spending Relative to U.S.



Directed Toward Commerce!

Figure 5

Range of Activity
National Laboratories



NL Skills Fill the Gap - But Have Not Been Fully Exploited for U.S. Commerce

Figure 6

CUMULATIVE RETURNS: S&P 500, FAMILY SELECTIONS

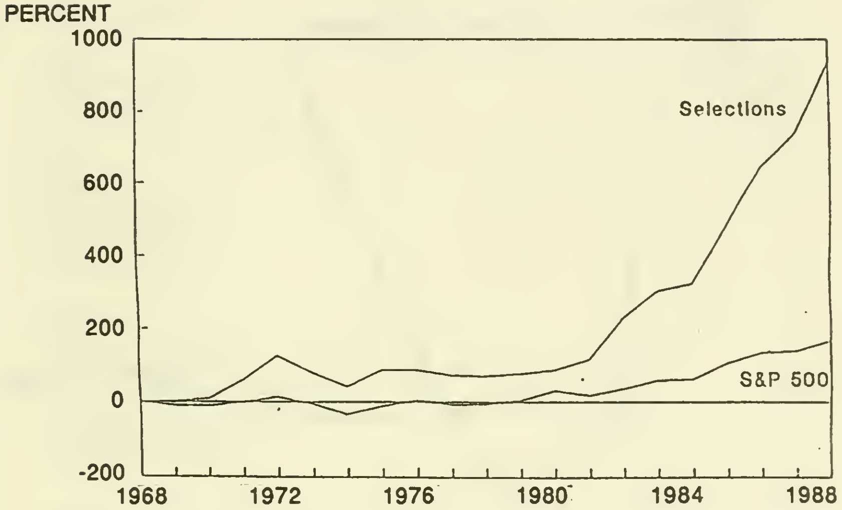


Figure 7

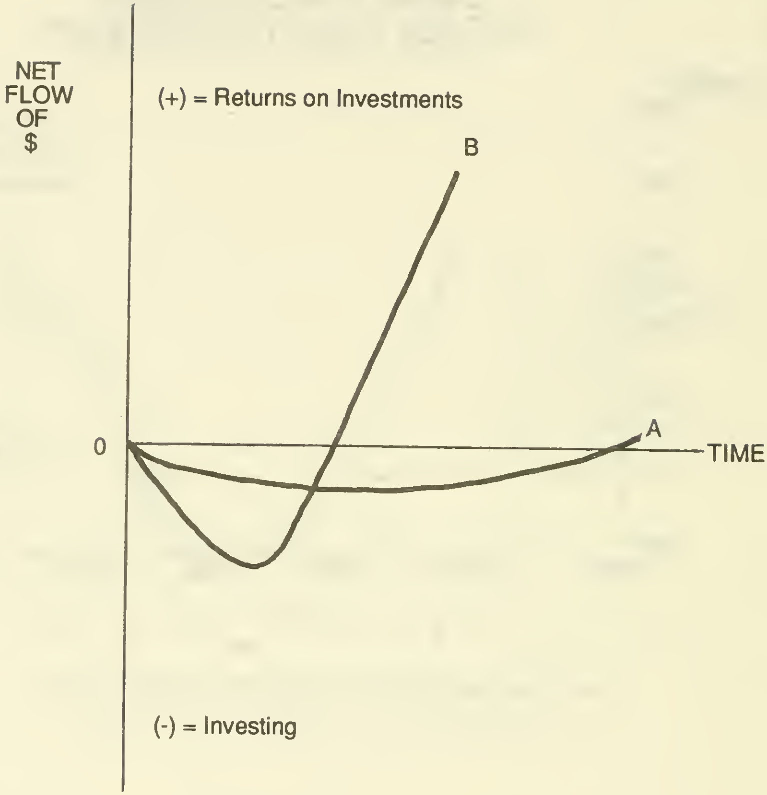


TABLE 1

TECHNOLOGY TRANSFER AGREEMENTS CREATING, OR ASSISTING IN THE CREATION OF START-UP COMPANIES SINCE JULY 1, 1984

	Public	Employment
1984		
Cirrus Logic, Inc.	Y	600
1985		
Kopin Corporation	Y	60
Rheocast Corporation		
Thinking Machines Corporation		500
1986		
Axiomatics Corporation		
Medic Monitor, Inc.		
Micrion Corporation		70
Osteo-Technology, Inc.		
Organogenesis, Inc.	Y	90
1987		
Biomat Corporation		
Biosurface Technology, Inc.	Y	95
Ergo Computing, Inc.		
Immulogic Pharmaceutical Corporation	Y	150
Mattek Corporation		
Thermal Technologies, Inc.		
Xenos Medical Systems		
1988		
Alpha-Beta Technology, Inc.	Y	86
American Superconductor Corporation	Y	75
Applied Biotechnology, Inc.		
Diamond Materials, Inc.		
Eidak Corporation		
Enzytech, Inc.	Y	45
Equine Biomechanics & Exercise Physiology, Inc.		
Matritech, Inc.	Y	40
Microdrop, Inc.		
Neomorphics, Inc.	Y	22
Oculon Corporation		
Paranomics		
Somatix Therapy Corporation	Y	100
Therion Biologics Corporation		

1989		
Celadon Corporation		
Faradaics, Inc.		
Instrumar, Inc.		
Interneuron Pharmaceuticals, Inc.	Y	25
Proteinix		
Transgenic Sciences, Inc.	Y	180
Xsirius Superconductivity, Inc.		
1990		
3-Space Motion, Inc.		
Amira, Inc.		
Arris Pharmaceutical Corporation		
Beyond, Inc.		
Boreas, Inc.		
Convolve, Inc.		
Micracor Corporation		15
Queues Limited		
Thixomat, Inc.		
Volumetric Imaging, Inc.		
1991		
Ariad Pharmaceuticals, Inc.		
Coastal Partners, Inc.		
Comtech Labs, Inc.		25
1992		
Exa Corporation		10
Gel Sciences, Inc.		
Geltex		
OneCell Systems, Inc. (formerly Microdrop)		
Polykinetix, Inc.		
Soligen, Inc.		10
Vazorx, Inc.		
Virus Research Institute, Inc.		
1993		
Cubist Pharmaceuticals, Inc.		
Infinite Grafics, Inc.		
Ingenex, Inc.		
Myco Pharmaceuticals, Inc.		
Silicon Video Corporation		
Stephen E. Librande		

National Strategies for Technology Development

John T. Preston, October 4, 1993

One of the first actions of the Clinton-Gore Administration was to issue broad guidelines for restructuring our Federal technology engine. Specifically, the U.S. Government spends approximately $70 billion per year on research and development. Before the end of the cold war, the primary purposes of federal research were military (e.g. electronics, avionics, advanced materials, etc.), energy, health, and advancing basic sciences, with military research accounting for the majority of the expenditures. Now President Clinton, working closely with the Vice President, intends to shift research investments such that half of the total budget is directly applicable to commerce before the end of his first term as President. This paper proposes strategies for redirecting research development so as to optimize job and wealth creation in the United States. In particular, we must create incentives for industry to adopt technology while motivating our laboratory and university generators of technology.

Existing Structures

Currently, the Government has three primary structures for stimulating industrial development of technology; competitively bid grants, co-development and consortia.

Competitive Bids

Grants given to industry based on competitive bid include Small Business Incentive Research Grants (SBIR) and Advanced Technology Program grants (ATP). These programs solicit competitive bids for Government funds where such bids are reviewed by experts based on i) the merit of the idea and ii) the reward to society if the idea works. These programs have clearly benefited Americans by accelerating the commercialization of technology. However, competitive bidding faces severe limitations. First, these programs are limited in how fast they can respond to emerging technological opportunities. After the opportunity is recognized by a company, someone must write a grant proposal. This activity is usually foreign to the individual. Furthermore, proposal preparation must be accomplished while keeping up with all other tasks which are typically more urgent. Thus, there is usually a delay at the company in preparing the proposal. Next, the proposal must wait for a review cycle which occurs once or twice a year. Finally the review process and selection adds another delay, although this is relatively short as most Government agencies have made excellent progress in reducing the selection process to only one to three months. All three sources of delay can, however, be significant, particularly in industries where international competition causes rapid rates of technological change. These rapidly changing industries are usually the ones where we most need technology development.

The second problem with competitive bid projects is that some companies abuse the system by making the bids a higher priority than commercialization of the technology. These companies have staff who specialize in winning bids. Thus, they have an advantage over the companies which are focused on commercialization, because the first priority is winning the bid and the staff are more skilled at writing bids that win. Such efforts often fail to succeed commercially and thus fail to provide the intended benefit to taxpayers even if the research might be excellent. The Government is starting to address this problem by placing greater emphasis on the commercialization plan outlined in the bid. However, most bid reviewers are researchers who are not sophisticated in technology commercialization and the potential for abuse remains high. On the other hand, hiring reviewers that are highly skilled in technology commercialization is not a viable solution because such reviewers would be a perceived or real threat to the company submitting the proposal. Such reviewers would be the people best able to take the idea and compete against the bidder.

The third problem with competitive bid programs is that the cost of the process can be high relative to the return. Take, for example, the following scenario. Suppose ten companies are bidding for a $50,000 SBIR grant. Each company devotes significant time and effort preparing the application at an average cost of $5,000 each. After reviewing each proposal the Government awards one $50,000 grant. If we now weigh the cost relative to the benefits, we would conclude that society did not really gain from this transaction because the cost of winning the money was the same as the money won. Actually, the above scenario could be viewed as even worse because we factored into the equation neither the costs of running the SBIR program nor the value of the time donated by the reviewers. If we wanted to be generous in the above example we could allocate an educational value to the proposal writing and reviewing processes. Nevertheless, it is clear that the lower the amount of the award and the higher the rejection ratio, the lower the end value is to society. It should also be noted that giving many small grants is politically more popular than giving a few large grants, which further fuels this problem. Furthermore, many small efforts might be worse than a few significant efforts. The small efforts can yield mediocre results, while the major efforts leapfrog our competitors.

Industry/Government Collaborations

A second structure for technology development is collaborative efforts between industrial technologists and Government researchers. These relationships were fostered by the Stevenson-Wydler Technology Transfer Act of 1980, and most commonly take the form of a Cooperative Research and Development Agreement (CRADA). Under a CRADA, Government researchers assist one or more companies with technology development. Thus, any U.S. company can approach any Government lab requesting assistance, and if mutually agreeable, enter into a CRADA. Usually, the company is allowed to take ownership of intellectual property generated by the Government, including the suppression of publications. As in the case of competitive bidding, we can see a clear win to American taxpayers with major limitations. The win is two fold. First, connecting Government technologists with industry technologists greatly increases the probability of useful results. As any good businessman knows, talking to your customer injects relevance, improves products and provides ideas for future products. Second, the actual collaboration often leads to more competitive products.

The biggest problem with CRADAs is that the process does not promote passionate behavior on either side - the company or Government lab. CRADAs usually require matching funds from the company, but the definition of matching funds is so loose that expenditures which would have occurred without the CRADA are now re-labeled as "matching." In fact, scenarios could be envisioned whereby corporate funding decreases when entering a CRADA. For example, suppose a company is spending $500,000 per year to develop a technology. The firm then finds a Government lab that is willing to collaborate on a one-for-one matching basis with all intellectual property going to the company. The company can now drop their internal expenditures to $300,000 per year and, with the Government's matching effort, increase the overall project commitment to $600,000 while giving their shareholders a $200,000 incremental profit.

While there is no evidence that the above (cynical) scenario has occurred, the structure of CRADA's contains low risk on the part of the company. Agreements which contain no risk often yield mediocre results because of a lack of passion. If, on the other hand, intellectual property was licensed to the company with exclusivity contingent on having a product on the market within a reasonable time period, and reaching minimum sales thereafter, the company would be more determined to succeed. This is particularly a problem with large companies. Small companies whose whole existence depends on the success of the project do not have the above problem - their passion cannot be higher.

Finally, the government labs can easily be seduced into believing that the CRADA itself is the goal instead of more competitive products. We are now seeing evidence that governmenr labs are measuring their technology transfer success by the funds devoted to CRADA's. As one of my colleagues put it, "CRADAs are like standing on the street corner offering to give $5 to everyone that has a matching $5 in their wallet." Missing from the above quote is the notion that we want something good to be accomplished with the $10. We must re-focus on the importance of job and wealth creation, rather than counting the dollars. Otherwise our labs will rush to do many CRADA's without the commitment for success. The success was achieved in their minds when the funds were committed. Without commitment to make more competitive products CRADAs will burn money without results.

Consortia

The third major structure for Government/industry technology development is industrial consortia. Under this structure the Government provides money to induce an industry to collaborate on finding solutions to shared problems. SEMATECH, a consortium of U.S. semiconductor manufacturers, is an example of such a consortium. Once again, we have a structure with major flaws, but which, in balance, has provided a reasonable return for American taxpayers. SEMATECH has helped the semiconductor industry significantly improve parts of the fabrication process. By pooling resources, including Government funds, SEMATECH has a critical mass. It has the resources to create a first rate effort to innovate rather than several mediocre efforts. One reason for SEMATECH's relative success is that it is focused on problems that are core to the industry but do not constitute the "crown jewels" of the member companies. Each semiconductor company views their circuit designs, microcode and maskworks as the heart of their business. Any collaboration on such critical technologies is fraught with numerous problems.

First, companies are unwilling to openly share information about technologies which are key to their competitiveness. Second, they resist being first to adopt technologies for which all members have rights. I have seen several consortia fail to commercialize new technologies because they attempted to work on the "crown jewels." The formation of such consortia is easy. Each company contributes a small amount of money and gets non-exclusive rights to intellectual property generated by the entire pool. The problem is that the cost of commercializing new inventions is higher for the first adopter than it is for the second company. Thus, the members of the consortia have an incentive to sit on the side-lines waiting for someone else to pay the price of blazing the trail and then follow with superior economics. Everyone wants to be first to be second.

Another problem with consortia is the tendency to try to solve all problems rather than focusing on a few problems. Trying to work on too many technologies eliminates the benefits of critical mass, leaving the consortia with several second rate efforts.

New Initiatives

Motivate Industry

The effectiveness of Technology Commercialization can be greatly enhanced by creating incentives for the industrial adopters of technology. To put this in perspective, compare the total annual U.S. Government investments in Research and Development, $70 billion, to the money invested by pension funds, $2 trillion. If we can find ways to reward investments in technology commercialization, the $2 trillion can have much more impact than modifying the way we spend the $70 billion. Another way to think of this is that changing the behavior of investors will translate into market pull, whereas redirecting the Government Research & Development more toward industry is technology push. Both are good activities, but I believe that market pull will motivate the technologists more than any top down directive.

The Gap

For most industries, particularly the older, physical science industries like auto making, utilities and consumer electronics, there is a gap in funding technology commercialization. Specifically, this gap is between the point where the Government considers the technology too applied for additional funding and industry considers the technology too embryonic to adopt. Often, our foreign competitors have been more aggressive to develop these technologies before us and have established significant competitive advantage.† There are many ways to motivate industry to help fill the gap. Clearly, rewarding investments that have a long term payoff would shift investments into the gap. This has been the general idea behind capital gains tax. Intuitively, we have known for years that long term investments create jobs and wealth. It is, however, probably under appreciated how destructive short term investments can be. One way to optimize the short term is to eat one's seed corn - to reduce investments in capital equipment and research and development to show better short term results.[††] If we were to sufficiently reward industry to invest long term, we would not need to encourage interactions between industry and our national labs and universities. Industry would be constantly searching our labs for new ideas.

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† see "Testimony Before the Energy Subcommitte of the House Space Science and Technology Committee," by John T. Preston, March 23, 1993.

Capital Gains Tax

The greater the tax differential between profits on short term investments and long term investments, the more we can influence job and wealth creation. Currently, our tax structure does not have a big enough differential. Note, that it makes no difference whether long term taxes are lowered or short term taxes are increased. Politically, I favor both lowering long term taxes and raising short term taxes. The reason for my position is that most people view capital gains tax reduction as a benefit for the rich, which it clearly is - but it is also a benefit for all of us who want jobs and wealth in the US. However, raising short term capital gains tax negates the argument that we are preferentially benefiting the rich by lowering capital gains tax. Furthermore, our capital gains tax structure is misguided in that we treat investments in real estate and art the same as we treat investments in manufacturing companies. We should reduce or eliminate tax breaks for investments that do not generate jobs and wealth, with the highest priority on high tech manufacturing jobs. These are the jobs that will create the highest, sustainable benefit to society.

R&D and Capital Equipment Tax Credits

If we were to give corporate tax credits for research funded at a university or Government lab or investments in capital equipment, we would also move industrial money into the gap. Research and Development tax credits would move resources into the early stages of the gap, while capital equipment tax credits would move money into the middle and later stages of the gap.

Tax Credits for Job and Sales Growth

Companies that are exhibiting outstanding performance growth should be encouraged. For example, I believe that any company that has U.S. based activities growing at a rate of 15% per year is applying its resources better than the U.S. Government could and should be rewarded or encouraged by a significant reduction in taxation.

[††] see Ibid., "Generating Wealth," by John T. Preston, November 11, 1992, and "Success Factors In Technology Development," by John T. Preston, September 26, 1992.

A New Process for the Government to Fund Technology Development

Clearly, motivating industry to apply part of the trillions of dollars it spends each year to technology development is more important than modifying the billions spent by the Government. However, in creating stimulators for industrial investment in technology, we should not ignore the fact that the Government is spending $70 billion per year on R&D, and ask whether we could develop programs that solve the problems cited above. Somewhat disturbing, is the fact that the Administration is seeking advice primarily from industry (which usually means big business). Big businesses are the most influential in Washington, particularly those which have suffered a downturn at the hands of foreign competitors and are being pushed by Wall Street to show near term results. If, as discussed above, industrial time horizons (particularly for our large companies) are too short, we could end up having the Government subsidize efforts that will fail to leapfrog our foreign competitors. Government money should be applied to the riskier high value projects in the gap. If the Government wants to get a good reading from industry, it should place great weight on the ideas presented by rapidly growing companies - these are the firms that best understand the importance of adopting innovative ideas in order to grow.

The most direct way to transfer Government funds to develop an emerging technology is to have someone knowledgeable in technology commercialization give money to the companies and programs that show the highest potential for job and wealth generation. A similar method is used to give money to programs within labs and universities. In this case, funds are given to researchers based on the promise of making scientific advances in key areas. Researchers that have delivered on this promise in the past are much more likely to be funded in the future, using only brief descriptions of the intended research. Formerly, DARPA would grant money to corporations on a similar basis - those that showed the best promise to move technology forward were rewarded with grants. The DARPA approach was very effective, but only worked because the Government (military) was the end customer for the technology. There are many reasons that this direct and simple strategy is not being applied today. The biggest reason that the Government avoids "picking winners" is that it creates a major conflict. The conflict is that the Government is no longer the customer, but rather strengthening American industry is the desired outcome. Picking one company to receive funds over another company is a case of judgment and can always be questioned. Recently, there was concern expressed over a Government proposal that would have funded one super computer company. The competitors that were not participating in the Government funding cried foul - claiming that they would do better things with the money.

Picking Winners Without Conflict

Suppose we could have the benefit of picking winners, without the conflict. Such a program could solve many, if not all of the shortcomings of the other programs discussed above. For example, if properly structured, it would:

1. be very fast in that the money could be rapidly/immediately deployed as opportunities are uncovered, thus responding to the fast pace of technology development,
2. create high passion because the company receiving the money would have exclusive intellectual property rights, and the organization granting the rights could require performance milestones,
3. allow work on the "crown jewels" - not just building the infrastructure, because the intellectual property will not be shared with competitors,
4. be less subject to political whims and pork, because it is run by the private sector,
5. be inexpensive to operate, not requiring the extensive review process,
6. have a lower drain on industry by not forcing the generation of thousands of unfunded proposals, and
7. eliminate the professional bidder problem by basing fund allocation on performance, not the quality of bids.

To be successful or properly run the program must:

1. be managed by people who understand the intersection of technology and industry,
2. be run by a non-profit, private organization,
3. minimize or avoid investments on internal research activities,
4. be judged only on long term job and wealth creation,
5. competitively bid to the Government for the right to disperse Government funds, and
6. have at least three or four competitive programs also distributing Government funds.

The reason the program must be managed by people who understand technology and industry is obvious, the goal is to have innovative technology adopted by industry. People who are too oriented toward technology will invest to create new technologies instead of businesses, and people who are too oriented toward industry will not have the broad view of emerging technologies needed to identify significant innovation. The desired talents are unfortunately somewhat rare. MIT's orientation toward technology and industry is very uncommon. Other examples of organizations dedicated to this gap between research and industrial innovation would include the Houston Advanced Research Center and some groups within Stanford and a handful of other research universities. Note that the funding gap problem is most severe in the physical science area - not life science. Therefore, the programs should target physical science, because we are already doing a good job of transferring technology in the medical and pharmaceutical fields.

The program must also be managed by a private entity. A public university or laboratory would be subject to the same conflict concerns as the Government - thus they could not pick winners without complaints from the losing companies. This must be a free market activity. Furthermore, the entity must be a non-profit because making a profit out of the distribution of tax dollars would be inappropriate and politically unacceptable.

If the organization managing the disbursement of funds (hereafter "center") also conducts research, it should limit the self funding of its own programs. It might be undesirable to eliminate such internal investments as the centers best able to properly invest Government money would also be the ones doing the most commercially relevant research and development. I would think that a proper limit on internal funding would be around 10-15% of total investments made by the center.

The Government should judge the centers' performance only on job and wealth creation and each center's funding should be subject to regular review for continued funding. I would recommend a five year review process. Judging performance on a time frame less than five years would not allow enough time to see the results and much more than five years might allow an unsuccessful program to waste Government funds.

Finally, the process must be competitive with several competing centers selected to manage Government funds. The centers must have an urgency/passion to show results. If the process is not competitive, a center could become lazy. However, the possibility of losing the management contract should motivate each center to show results. Also, we must have multiple centers to avoid complaints from companies whose competitors are funded. If we have multiple centers, the free market is determining who gets funded. If a company is not chosen by any of the centers, that company must not have demonstrated sufficient skills, resources and the passion to be selected. If we have only one center, then there is no longer a free market and the same complaint that prevents the Government from picking winners would apply, thus killing the program. Needless to say each center must have the flexibility to compete with other centers and should not be limited to regional activity.

Conclusions

The United States has today a unique opportunity to revitalize our economy. We have the most powerful technology and innovation engine in the world - it is just off track. Existing programs like ATP, SBIR, SEMATECH and CRADAs should not be abandoned, but they have significant shortcomings that limit their ability to fulfill the President's desire to utilize technology for major improvements in American competitiveness. Creative new programs that motivate industry to adopt technology and reallocate the disbursement of Government research and development funds should result in significant job and wealth generation.

Additional Material Submitted for the Record by John T. Preston to the
SUBCOMMITTEE ON ECONOMIC GROWTH AND CREDIT FORMATION
with the kind permission of the author, D. Mark Cunningham

WORKING CAPITAL: DOLLARS WITH SENSE

With the passage of the Employee Retirement Income Security Act (E.R.I.S.A.) in 1974, this country witnessed a dramatic increase in pension plan ownership of most of the large corporations. Because these funds are tax-free and have grown so rapidly, financial theorists and the transactions-based financial services industry have spent the past 16 years developing trading strategies and financial products to address the needs of these entities. As a result today, institutional investors own most of the stock in America and account for about 82% of the trading volume.

Such institutional investors, pension funds and endowments are more interested in consistency of returns than high growth because they must meet actuarial payout assumptions for beneficiaries or run an educational or religious institution's budget on the results.

The tax-free status of these assets combined with a desire for consistency of performance has led the financial theorists to concentrate on the mathematics of portfolio risk reduction at the expense of real economic wealth-building. The dramatic drop in costs, and increase in capability, of data processing technology in the financial centers have been a catalyst for the rapid spread of this methodology (witness the Nobel Prize winners in the field of finance for the past two years). Markowitz has the rather unique distinction of actually having founded an entire industry.

Although initiated with the best of intentions by all players, government, academics, and institutional investors, this technology has had two unforseen consequences.

First, the academics and financial centers have focused on developing investment technology which provides small incremental and near-term returns on huge pools of assets (billions of dollars) that do not have to pay capital gains tax, and consequently under the current tax structure this technology is of little value to even the wealthiest of individual investors. In the absence of any action on the parts of the taxable investors, the net effect of this technology is to transfer the risk from tax-free investors to the taxable, in the form of increased market price volatility through reduced return/risk opportunities in the secondary public equity markets. Market price volatility creates a trading atmosphere and feeds the transactions-based financial centers in the manner of a positive feed back system, enhancing volatility.

Second, the passive near-term nature of the pension plan's ownership, to those in control of the corporation, forces management into a near-term orientation, which obviates many superior long-term wealth building strategies that could enhance the growth of the corporation, the returns to investors, and the strength of the U.S. economy.

The consequence of these two developments has been to sever the ownership of corporate assets from the control of corporate assets. There is no question that legislation preceding E.R.I.S.A. has also had its role in severing ownership from control in the public equity markets. The Glass-Steagall Banking Act of 1933, the Securities Act of 1934, the Chandler Bankruptcy Revision Act of 1938, and the Investment Company Act of 1940 all restricted active investors and raised their cost of ownership in the name of protecting less well-informed investors. To distribute entrepreneurial risk over many small investors and protect them from being disadvantaged, a new equity interest was in effect created which took a living, breathing economic engine for wealth, with a given growth stream,the corporation, and parcelled it out to many as a sterile, fungible commodity of carefully measured risk for an expanding institutional market. Consequently, entrepreneurial risk is currently over-diversified.

Corporate management diversifies through various divisions, institutional investors diversify through portfolios, and manager consultants diversify among institutional investors. Overdiversification eases the transfer of wealth but limits the creation of wealth. Wall Street rarely creates wealth the way it did prior to 1940; rather, it concentrates it or parcels it out through financial transactions. To improve the corporation of wealth on the shop floor in the mid-West, you have to be there! Wall Street as a financial center prefers to offer carefully measured pieces of many shop floors to reduce the risk of a problem. An extreme example of this severing of ownership and control is indexing. Consequently, most of the legal ownership of our public corporations can only vote with their feet.

The question arises as to what have been the consequences of these developments. To examine these results we must analyze the actual results of the investment industry as an aggregate. Below is the actual performance of 1,120 Institutional Investment Managers over an 8-year time period in terms of their ability to be in the top quartile, for equity funds, bond funds and balanced funds.

Analysis of Performance 1,120 Institutional Investment Managers

Time Period	Incidence of Success (Top Quartile)	Equity Funds	Bond Funds	Balanced Funds
8 years	8 ≥ successes	0.2%	0.0%	0.2%
8 years	6 ≥ successes	1.8%	0.0%	1.4%
8 years	4 ≥ successes	14.7%	11.9%	13.0%
8 years	2 ≥ successes	50.3%	52.3%	51.0%
8 years	0 successes	100.0%	100.0%	100.0%

The distributions of performance for equity funds, bond funds and balanced funds were so similar as to indicate an underlying common cause. Suspecting that the common cause may be random performance we employed the binomial formula which assumes statistical independence of performance and in this case a 25% probability of being in the top quartile.

$$(8!/8!0!)(0.25)^8(0.75)^0 = 0.00002 - 0.0\%$$

The formula yielded this distribution:

Random Performance

Time Period	Pure Luck Incidence of Success	Predicted % of Institutional Investment Managers
8 years	8 ≥ successes	0.0%
8 years	6 ≥ successes	0.4%
8 years	4 ≥ successes	11.4%
8 years	2 ≥ successes	63.3%
8 years	0 successes	100.0%

Crudely, to see if further analysis was merited we backed the actual observed occurrence of top quartile behavior through the binomial formula and solved for their implied probability of success. The results are below.

Analysis of Implied Probabilities for Performance 1,120 Institutional Investment Managers

Time Period	Incidence of Success (Top Quartile)	Equity Funds	Bond Funds	Balanced Funds	Pure Luck Standard
8 years	8 ≥ successes	45.0%	25.0%	45.0%	25.0%
8 years	6 ≥ successes	32.0%	25.0%	31.0%	25.0%
8 years	4 ≥ successes	27.0%	25.0%	26.0%	25.0%
8 years	2 ≥ successes	20.0%	21.0%	21.0%	25.0%
8 years	0 successes	25.0%	25.0%	25.0%	25.0%

As can be seen the results were reasonably close to random. Close enough not to rule out the possibility that the results for equity, bond and balanced fund managers were indeed equivalent to the results from gambling at a fair casino.

The following cumulative results (i.e. 6 successes include 7 and 8 successes and 4 successes include 5, 6, 7, and 8 successes)

Analysis of Performance 1,120 Institutional Investment Managers

Incidence of Success (Top Quartile)	Equity Funds	Bond Funds	Balanced Funds	Pure Luck Standard
8 ≥ successes	2	0	2	0
6 ≥ successes	20	0	16	5
4 ≥ successes	165	133	146	128
2 ≥ successes	563	586	571	709
0 successes	1120	1120	1120	1120

were converted into discrete results (i.e. 8 successes, 6-7 successes, 4-5 successes, etc.) below

Analysis of Performance 1,120 Institutional Investment Managers

Incidence of Success (Top Quartile)	Equity Funds	Bond Funds	Balanced Funds	Pure Luck Standard
8 successes	2	0	2	0
6-7 successes	18	0	14	5
4-5 successes	145	133	130	122
2-3 successes	398	453	425	557
0-1 successes	557	534	549	416
Total	1120	1120	1120	1120

Then reconverted to the percentage incidence of occurrence among the aggregate group below.

Analysis of Performance 1,120 Institutional Investment Managers

Incidence of Success (Top Quartile)	Equity Funds	Bond Funds	Balanced Funds	Pure Luck Standard
8 successes	0.178	0.000	0.179	0.000
6-7 successes	1.607	0.000	1.250	0.446
4-5 successes	12.946	11.875	11.607	10.893
2-3 successes	35.536	40.446	37.946	51.518
0-1 successes	49.732	47.679	49.018	37.143
Total	100.000	100.000	100.000	100.000

Once this transformation was complete, Chi-Square analysis was employed to compare the equity fund, bond fund, and balanced fund performance to that to be expected from pure luck.

Equity Funds Compared with Pure Luck

Incidence of Success (Top Quartile)	Equity Funds	Pure Luck	n^2/nP
6-8 successes	1.785	0.446	7.144
4-5 successes	12.946	10.893	15.386
2-3 successes	35.536	51.518	24.512
0-1 successes	49.732	37.143	66.588
Total	100.000		113.63

100 - 113.63 = -13.63
x d.f.3 = 7.81
Since: -13.63 < -7.81

With regard to equity funds, we can be 95% confident that the performance is not that to be expected from pure luck but actually worse in that 50% (49.7%) of the 1,120 equity managers were only in the top quartile 1 of the 8 years or not at all! With pure luck we would have expected to see the largest aggregation of top quartile performance at the 2-3 year level.

Bond Funds Compared with Pure Luck

Incidence of Success (Top Quartile)	Bond Funds	Pure Luck	n^2/nP
4-5 successes	11.875	11.339	12.436
2-3 successes	40.446	51.518	31.735
0-1 successes	47.679	37.143	61.204
Total	100.000		105.375

100 - 105.375 = -5.375
x d.f.2 = 5.99
Since -5.37 > -5.99

With regard to bond funds, we can be 95% confident that the performance is that to be anticipated from random probability, as seen above.

Balanced Funds Compared with Pure Luck

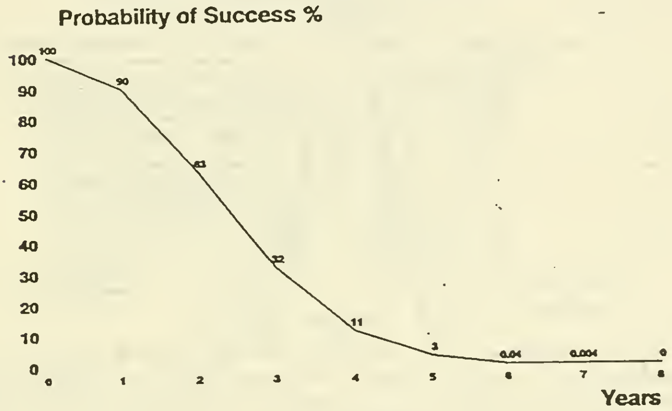
Incidence of Success (Top Quartile)	Balanced Funds	Pure Luck	n^2/np
6-8 successes	1.429	0.446	4.579
4-5 successes	11.607	10.893	12.368
2-3 successes	37.946	51.518	27.949
0-1 successes	49.018	37.143	64.690
Total	100.000		109.586

100 - 109.56 = -9.586
x d.f.3 = 7.81
Since: -9.586 < -7.81

Finally with regard to balanced funds, due to the influence of the equity component on the bond component we can be 95% confident that the performance is worse than random with again approximately half (49%) of the balanced fund managers earning top quartile performance only once during the eight year period or not at all.

Given the random to worse than random nature of the incidence of top quartile performance for equity, bond and balanced fund managers over the eight year period, we can assume normality and statistical independence of top quartile performance and forecast with a high degree of reliability a given equity, bond or balanced fund manager's probability for being in the top quartile over a various number of consecutive years,

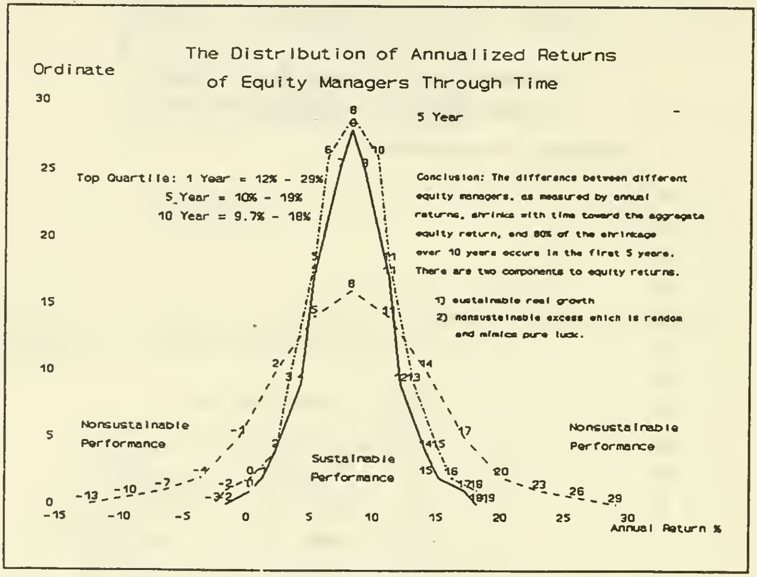
**Probability of Top Quartile Performance
Over the Next One through Eight Years**



We can conclude that the probability of top quartile performance drops off dramatically with the passage of time, and so closely resembles the distribution from gambling that there is truly a high component of luck within the distribution of top quartile performance among institutional investors.

We can conclude that the probability of top quartile performance drops off dramatically with the passage of time, and so closely resembles the distribution from gambling that there is truly a high component of luck within the distribution of top quartile performance among institutional investors.

Beyond looking at the distribution of top quartile performance we can examine all returns of equity managers over 10-year, 5-year and 1 year periods to determine what further information can be obtained.



The Distribution of Annualized Returns of Equity Managers Through Time

Conclusion: The difference between different equity managers, as measured by annual returns, shrinks with time toward the aggregate equity return, and 80% of the shrinkage over 10 years occurs in the first 5 years. There are two components to equity returns.

1) sustainable real growth
2) nonsustainable excess which is random and mimics pure luck.

By aligning the means of the three respective performance distributions above, we can draw several conclusions about the impact of time upon the dispersion of returns.

First, the difference between different equity managers shrinks with time toward the mean and 80% of the observed shrinkage occurs in the first five years.

It can be noted that the internal border of the top quartile performance representing sustainable performance varies only 2.3% (12%-9.7%) over the annual distribution and ten year distribution, as compared with the external border which represents non-sustainable performance and varies 11% (29%-18%).

The obvious conclusion is that the further end of the top quartile exhibits a stability and consistency which is attributable to a constant cause. This internal stability together with the central tendency of the dispersion of returns over time indicated the presence of two separate components, a sustainable component to performance, and a non-sustainable "luck" component to performance.

Given this information we can, through further mathematical transformation, forecast with a reliable degree of accuracy the influence of the luck factor on the components of a diversified portfolio over time.

INTRA-PORTFOLIO PERFORMANCE AND ITS CONTRIBUTION
TO THE OVERALL PORTFOLIO RETURN, THROUGH TIME

	YEARS										
	0	1	2	3	4	5	6	7	8	9	10
0%											
10%	10.0	11.3	12.8	14.3	16.0	17.7	20.0	21.5	23.4	25.5	27.5
20%	10.0	10.9	11.7	12.5	13.4	14.2	14.9	15.7	16.4	17.0	17.6
30%	10.0	10.6	11.1	11.5	12.0	12.4	12.7	12.9	13.1	13.3	13.4
40%	10.0	10.3	10.6	10.9	10.9	11.0	11.1	11.0	11.0	10.8	10.7
50%	10.0	10.1	10.2	10.1	10.1	9.9	9.8	9.5	9.3	9.0	8.7
60%	10.0	9.9	9.7	9.5	9.3	9.0	8.6	8.3	7.9	7.5	7.1
70%	10.0	9.7	9.3	8.9	8.5	8.1	7.6	7.1	6.6	6.1	5.7
80%	10.0	9.5	8.9	8.3	7.7	7.1	6.5	6.0	5.4	4.9	4.4
90%	10.0	9.2	8.3	7.6	6.8	6.1	5.4	4.8	4.2	3.7	3.2
100%	10.0	8.7	7.5	6.4	5.4	4.6	3.9	3.2	2.7	2.2	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

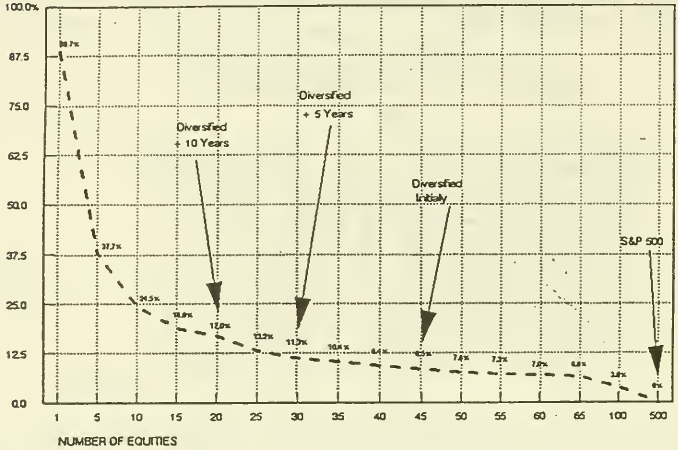
We can see that the impact of random behavior will, over 10 years, concentrate the top performing decile into 27.5% of the portfolio, regardless of whether the portfolio's overall performance is appreciating or declining and independent of the magnitude of performance. The strength of this force on the equities which comprise the performance of the analyzed equity managers can be demonstrated by the consistency to which the weightings will shift in any diversified portfolios over a ten year period.

Given this predictability, we can significantly reduce the emphasis on rebalancing portfolios and concentrate more efforts on the reliability function of performance - the sustainable component and that component which is most aligned with the growth of our economic infrastructure.

For instance, we can see that it takes 6 years for the random force in a diversified portfolio to double the impact the top performing decile has on the portfolio, and 4.5 years to halve the contribution of the bottom performing decile. However, since the middle 60% varies in the aggregate only 0.4% over the five year period and the mid-point varies only 0.5% we can see that there is no significant change in the volatility of a diversified portfolio over a 5 year period.

Indeed taking this analysis and looking at aggregate performance over time,

EXCESS VOLATILITY OF DIVERSIFIED 44 STOCK PORTFOLIO
TO THE S&P 500



we can see that, in the case of a diversified portfolio, the aggregate increase volatility over a 5 year period is only 2.8% (11.3%-8.5%)

The conclusion is clear. We must emphasize underlying economic performance, not financial transactions for the sake of continuous portfolio optimization, which is essentially detrimental to the longterm performance of the portfolio, contributes little to creation of wealth and siphons off transactions fees.

Once we have established that there are two components sustainable and non-sustainable to performance, and that continuous optimization offers little incremental benefit in the first five years then the issue becomes whether we can find certain segments of the market which offer more sustainable performance as a larger portion of their return than others. If we attribute sustainable performance to their underlying economic growth than we can look to companies that have more closely controlled operations to have more sustainable performance.

To test this assumption in a crude fashion we created a matrix of the S&P 500 as the market index, in terms of capital appreciation over the 20 year period from 1968-1988. (Please turn to Exhibit A on page 21)

90% of the time of the 210 annual returns observed were between (5%) and 14%.

We then created a matrix from the universe of all publicly held companies that were closely held i.e. 10% or more of their outstanding equity was held by an insider (or group of insiders) who was (or were) active in the day-to-day operation of the corporation. (Please turn to Exhibit B, on page 21)

90% of the 210 observations were between 1% and 27%.

Next we subtracted the S&P 500 matrix from the Active Investor matrix. (Please turn to Exhibit C, on page 22)

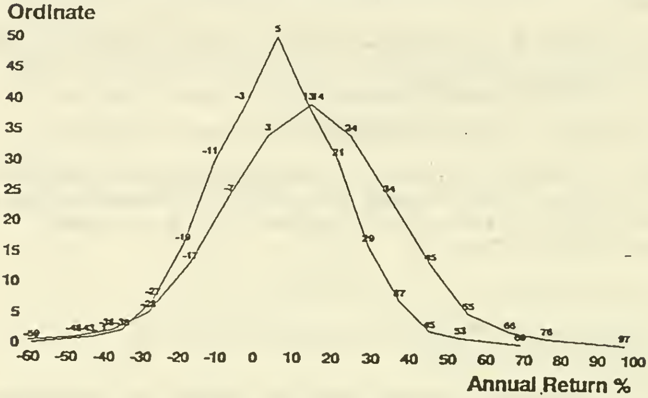
97% of the 210 observations were exceeded the S&P 500 on a capital appreciation basis by 1% and 60% by a consistent 9% to 12% basis every year.

To illustrate the dramatic impact of these consistently higher returns in terms of wealth creation compounding through time, we created from the same data the value of a $1. (Please turn to Exhibit D, on page 23)

For the S&P 500, we can ~~see that~~ $1 invested from 1969-1988 increased to $2.67. On the other hand for the Active Investor Universe over the same period of time the $1 increased to $13.14. (Please turn to Exhibit E, on page 23)

To show the stability of this increase in wealth creation we subtracted the Active Investor wealth creation matrix from the S&P 500 matrix. (Please turn to Exhibit F, on page 24)

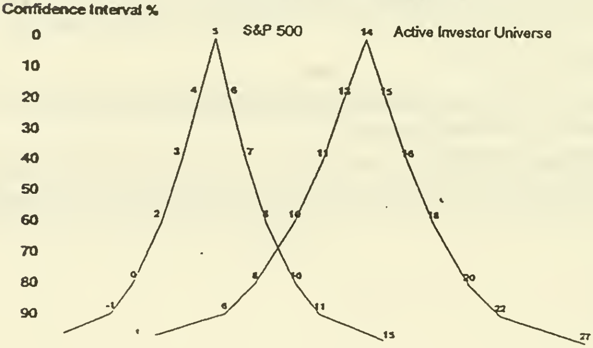
To better understand the relationship between the Active Investor Universe and the S&P 500 we plotted both return distributions below.



The Distributions of Annualized Returns for the S&P 500 and Active Investor Universe

(Price Appreciation 1969-1988 Inclusive)

and then plotted the confidence intervals for the respective distributions below.



Confidence Intervals for Annualized Returns for S&P 500 and Active Investor Universe

(Price Appreciation 1969-1988 Inclusive)

We can see that over the 20 year period, plotting 210 annual returns, that the Active Investor Universe outperformed the S&P 500 in both positive and negative equity environments and that the outperformance is amplified in positive equity environments.

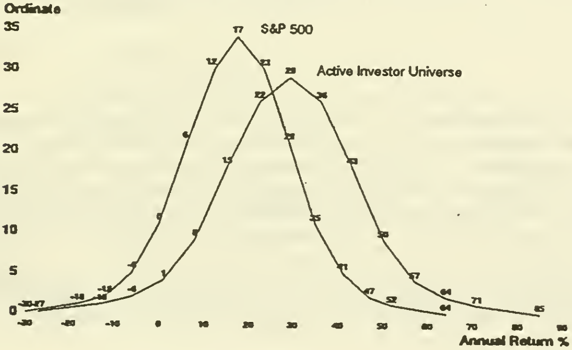
Finally, a formalized statistical test was conducted which concluded with 90% confidence that the Active Investor Universe and the S&P 500 differ with regard to performance and that 90% of the observations show the Active Investor Universe ahead of the S&P 500 on an annual basis by 1.06% or more.

As all of this analysis had been done on returns that were capital appreciation only we then examined the relationships between S&P 500 and Active Investor Universe including dividends, to rule our the unlikely possibility that differing yields could offset so dramatic a difference in results.

For convenience sake we only looked at the 10 year period 1980-1989, plotting the following annual return distributions:

The Distributions of Annualized Returns for the S&P 500 and the Active Investor Universe

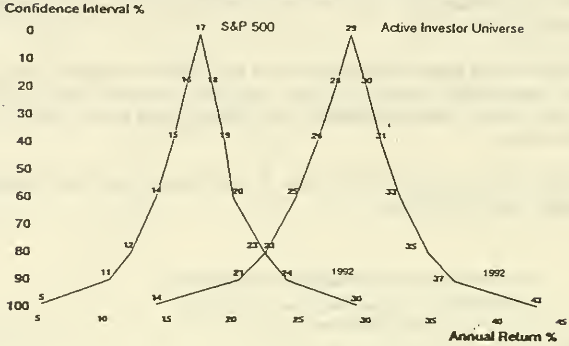
(Total Returns 1980-1989 Inclusive)



and then plotted the following confidence interval analysis.

Confidence Intervals for Annualized Returns for S&P 500 and Active Investor Universe

(Total Returns 1980-1989 Inclusive)



As can be seen the relationship between the S&P 500 and Active Investor Universe was consistent when dividend yield was taken into account. The Active Investor Universe significantly outperformed the S&P 500 in both positive and negative environments in equities. Just as before, the difference was amplified in positive equity environments. Indeed in 1991 when the market appreciated 30.4%, the Active Investor Portfolio behaved in line with that expected for the Universe and appreciated 41.5%

Finally a formal statistical test of the S&P 500 and the Active Investor Universe indicated that we can be 95% confident that the Active Investor Universe outperforms the S&P 500 and that at least 95% of the population of returns will exceed the S&P 500 on an annual basis by 1.34% or more.

The reason that the Active Investor Universe has more and higher sustainable performance is that linking control and ownership boosts longterm returns within an industry through capture of market share. We can demonstrate this mathematically.

1) Within an industry, the likelihood of the successful capture of market share at any point in time can be described by the following formula:

$$1 - \ (^q/_p)^c \left[1\text{-}(^q/_p)^w\right]$$

$$1\text{-} \ (^q/_p)^{c+w}$$

which when p = q reduces to:

$$1 - \frac{C}{C+W} \quad \text{(for } p{=}q\text{)}$$

If the process above is continuous, then it becomes:

$[1\text{-}(q/p)^c]$ (for p not equal to q)

where p = probability of success
q = probability of failure
W = desired economic amount of success in dollars of market share captured
C = market capitalization in dollars of the controlled portion of outstanding equity

It would be very risky for a firm to put all of its capital into an effort to find a solution to a specific problem. But as a going concern faced with competition for industry resources, it will have a fixed sum of capital set aside for such purposes. Any amount beyond the allocated amount would cause other company activities (e.g., existing customer relations) to suffer. The probability of ongoing success in a competitive industry is $1\text{-}(q/p)^c$, in terms of capture of market share. Therefore, as C gets larger, the quantity $1 - (q/p)^c$ also grows. There are two important implications to this that need to be stressed.

First, for a fixed initial capital as a specific problem requires larger amounts of money for a search for its solution, the probability of finding the solution must be larger in order to maintain a certain probability of success. For example, suppose a competitor has available $1,000,000 or four units of $250,000. Assume that the company requires that any project should have a success probability of 0.95 or greater. Consider an opportunity for market share capture that costs $250,000 which would have a return of $500,000 if successful. This is an even money bet since the net winnings would be $250,000. The company must have a probability of 0.68 or greater of being successful to embark on the project (since $1 - \left[\frac{0.32}{0.68}\right]^4$ is about 0.95). On the other hand, for the same company, if the opportunity costs $500,000 and the return is $1,000,000 then there must be a probability of 0.82 of a solution (since $1 - \left[\frac{0.18}{0.82}\right]^2$ is about 0.95).

Second, a competitor with a larger C can support more long-term searches for a solution at the same probability of success. Alternatively, it can spend the same amount at a lower probability of solution and maintain the same probability of success. Therefore, a competitor with $1,000,000 available for capturing market share could maintain the same probability of success on a $25,000 expenditure if the probability of a solution were only 0.52 (since $1 - \left[\frac{0.48}{0.52}\right]^{40}$ is approximately 0.95). It necessarily follows that the $50,000 expenditure would require probability of a solution to be about 0.54 (since $1 - \left[\frac{0.46}{0.54}\right]^{20}$ is approximately 0.95). In order to represent the relationships in a more meaningful way, we need to generalize the formula to include the possibility of other than even money bets. If we take the cost of the search for a solution as our measuring unit, then we must express both capital and net return in terms of this unit.
Therefore,

let $Cr = \text{capital ratio} = \frac{\text{Total Capital for Market Share Expansion}}{\text{Cost of Individual Opportunity}}$

$$\text{and Rr = return ratio} = \frac{\text{Solution Return Cost of Opportunity}}{\text{Cost of Opportunity}}$$

Then it can be shown that the probability of success will be $1\text{-}M^{Cr}$ where M is the single root, between zero and one, of the equation $pm^{Rr+1} -m+q=0$ where p is the probability of being successful and $q=1\text{-}p$. For any specific values of Cr, Rr and p, this equation can be solved for m, and the probability of success will be $1\text{-}M^{Cr}$.
The conclusions that result from further limits to the expenditures a loosely held company can undertake in order to find problem solutions as compared to a tightly controlled company. The introduction of the fact that success is not certain results in further limitations on loosely held companies must maintain protection in the form of control over their probability of failure.

We have assumed therefore that there is a probability of finding a solution but that this solution if found will permit a fixed gain. Actually, there will be probability distribution of returns if a success occurs, the characteristics of which will be dependent upon industry economic conditions.

Two other points need to be emphasized on the effect of company capital structure on the likelihood of success. First, such successes are not lump sum windfalls, but rather occur in the form of some increment to earnings over a period of years. In turn, the number of years cannot be assumed to be too great because subsequent industry dynamics will either require new efforts or render the success irrelevant, and even in a staid industry, the NPV of future income streams will trail off. From the standpoint of a loosely held company, the effect is to require a greater margin of safety (as compared with the tightly controlled company) against a bad luck streak.

This spreading of the incremental return over a number of years means that there is less of a chance of one good solution sustaining the available assets against several successive failures. Therefore, the probability distribution of potential returns is reduced for loosely held companies relative to tightly controlled companies.

The net effect is that there is a strong relationship between the capital structure of the corporation (C) and the problems and probabilities for success for which the company can find solutions, as the longer the time horizon, the greater the range of costs that can be considered as variable rather than fixed. We would not expect then to find loosely held companies so often undertaking the solution to problems which have an indirect or smaller effect on their focused objectives. Only the tightly controlled companies can afford to assume the risk of undertaking solutions to problems for which the reward is high but the probability of return is low or that have an indirect effect on corporate objectives. Consequently, tightly held corporations are more opportunistic and tend to outperform loosely held ones.

In conclusion, we have determined that:

1) Currently consistent top quartile performance by equity managers, bond managers, and balanced fund managers is random or worse than random.

2) The high end of the top quartile is purely random but the lower perimeter of the top quartile is consistent.

3) There are two components to top quartile performance non-sustainable (luck) and sustainable performance related to the underlying economic growth of the corporation.

4) Due to the random nature of manager performance (directly attributable to the weighted average of the equities which they hold, and the central tendency of their aggregate dispersion of returns over time), we can forecast the changes in weightings of a diversified portfolio through time and see the advantage to holding securities with high components of sustainable performance and not hurting performance by continually optimizing returns.

5) It is better to find a segment of the market which has a high component of sustainable performance due to up front analysis and leave it alone, rather than continuously looking for new opportunities. Secondary capital market analysis ought to more closely resemble primary market analysis where much analysis is done on the front-end and longterm commitment is made to the project.

6) The universe of publicly held companies with more than 10% ownership held by an insider active in the day to day affairs of the corporation consistently and significantly outperforms the S&P 500.

7) The linkage of Active Investor firms between ownership and control boosts longterm returns within an industry through capture of market share.

Active investors due a better job of generating sustainable performance than equity managers, which is not surprising given that the SEC regulations of insider trading reflect their accepted superior access to company-specific information and hands-on ability to solve problems (and even to time the solution to problems).

Consequently, ownership and control when tightly linked, boost long-term returns and permit management more flexibility with regard to wealth-building strategies. This linkage fosters the search for real economic solutions to wealth creation as opposed to computer-based gambling with the goal of concentrating wealth that already exists.

Within the publicly held corporation, the solution appears to be in encouraging increased equity ownership of directors, managers, and employees, i.e., those who can make a difference on the shop floors in the mid-West. This will shift incentives from F.A.S.B. earnings to cash flow and value added accounting. For investors, the solution is to invest for the long-term in those companies where the linkage of ownership and control is proven, where those in control are good stewards because their ownership positions outweigh any conflicting managerial interests.

Ultimately, this constitutes a bet on motivated human capital as in terms of wealth creation, as the following returns indicate, we can accomplish much more by working in partnership with corporate management over the longterm than by "shorting" stocks or other nearterm trading activities which foster an adversarial relationship with corporate management, attempt to concentrate wealth which already exists, and hamper longterm corporate planning.

SUMMARY OF ACTIVE INVESTOR vs. S&P (1979 - 1991)

Annual Returns (%)	ACTIVE INVESTOR	S&P 500
1979	23.92	18.45
1980	23.38	31.02
1981	19.92	(4.88)
1982	43.57	20.37
1983	45.24	22.31
1984	9.94	5.97
1985	55.10	31.06
1986	35.68	18.54

1987	14.14	5.67
1988	26.02	16.34
1989	25.26	31.59
1990	0.90	(3.09)
1991	41.50	30.40
13 Year Annualized Average	27.17	16.54

Values of $1.00

$

1979	1.23	1.18
1980	1.52	1.55
1981	1.83	1.47
1982	2.63	1.77
1983	3.82	2.17
1984	4.20	2.30
1985	6.51	3.01
1986	8.85	3.57
1987	10.10	3.77
1988	12.72	4.39
1989	15.93	5.78
1990	16.08	5.60
1991	22.75	7.31

EXHIBIT A

S&P500

ANNUAL RETURNS

1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	YEAR
-11.3514	-3.80594	-0.57133	3.253413	-1.24575	-6.68808	-1.99588	0.428843	-0.97427	-0.77250	0.350902	2.257136	1.281022	2.189041	3.131204	3.072181	4.265773	4.815672	4.667044	5.040780	1969
	0.077762	5.306727	8.642147	1.458649	-5.72425	-0.34144	2.234282	0.406931	0.479510	1.601079	3.594438	2.412632	3.313425	4.252808	4.060189	5.329303	5.854368	5.638048	5.983619	1970
		10.78676	13.18407	1.916377	-7.12806	-0.42905	2.594776	0.451175	0.527331	1.772840	3.950755	2.625711	3.586015	4.579481	4.349149	5.687640	6.221956	5.973335	6.320576	1971
			15.63328	-2.24881	-12.4285	-3.03089	1.030552	-1.17513	-0.85859	0.698940	3.217727	1.843428	2.955081	4.078183	3.869728	5.332529	5.927602	5.679536	6.063539	1972
				-17.3655	-23.7916	-8.58219	-2.32234	-4.23145	-3.36886	-4.27089	1.762808	0.416541	1.766370	3.086800	2.943218	4.579261	5.266357	5.047770	5.497436	1973
					-29.7180	-3.84639	3.277691	-0.63388	-0.29699	1.701148	4.835015	2.892982	4.148617	5.391901	5.022654	6.652062	7.244836	6.863478	7.223996	1974
						31.54900	25.19529	11.52440	8.811411	9.502062	12.05988	8.651229	9.396834	10.24496	9.326875	10.77333	11.08893	10.36419	10.50844	1975
							19.14846	2.685959	2.141774	4.593815	8.523224	5.242822	6.552673	7.836963	7.102097	8.885487	9.394785	8.761018	9.036771	1976
								-11.5019	-5.42837	0.148671	6.018400	2.662865	4.586830	6.311188	5.684589	7.801177	8.464433	7.862848	8.233913	1977
									1.062039	6.537119	12.59793	6.545030	8.139826	9.610780	8.398383	10.49299	10.94415	10.01849	10.23797	1978
										12.30881	18.85066	8.438020	9.985407	11.40539	9.671873	11.91027	12.24550	11.08142	11.19464	1979
											25.27357	6.552943	9.221670	11.18087	9.151962	11.84399	12.23646	10.90647	11.07152	1980
												-9.73040	1.781422	6.702831	5.351829	9.248960	10.12639	8.931190	9.358971	1981
													14.76132	16.00939	10.91976	14.58724	11.59387	12.39682	12.39739	1982
														17.27104	9.047484	14.52927	14.55205	11.92980	12.00817	1983
															1.400594	13.18252	13.65980	10.63294	10.98478	1984
																26.33341	20.33448	13.89355	13.51852	1985
																	14.62040	8.140806	9.542569	1986
																		2.027501	7.088641	1987
																			12.40084	1988

Ending Year

Total Outliers 23
Total Observations 210
89%: (5%) - 14%

Beginning Year

EXHIBIT B

Active Investor

UNIVERSE

ANNUAL RETURNS

1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	YEAR
-9.56809	-5.37821	4.763451	8.567802	0.616535	-4.10501	1.921396	5.290253	4.992635	6.091811	7.010975	8.624503	8.408146	10.51674	11.87482	11.31904	12.70000	13.20052	13.24946	13.74363	1969
	-0.88955	12.76291	15.38805	3.337102	-3.33755	3.973496	7.604197	6.970365	7.991216	8.627583	10.44976	10.05850	12.23507	13.58817	12.87194	14.26128	14.70578	14.67393	15.12496	1970
		28.29800	24.50349	1.785688	-3.94004	4.974373	9.088970	8.142982	9.155894	9.964440	11.65270	11.11184	13.40425	14.78576	13.92507	15.35003	15.75824	15.66205	16.08694	1971
			20.82308	-5.30081	-12.7727	-0.18086	5.607407	5.108411	6.665379	7.865400	9.942188	9.525455	12.13936	13.72630	12.88872	14.47695	14.96735	14.91508	15.40608	1972
				-25.7762	-25.8854	-6.31189	2.112873	2.217455	4.472601	6.131403	8.652865	8.337263	11.30608	13.10219	12.25153	14.00282	14.56010	14.53164	15.07570	1973
					-25.9945	5.258067	13.56899	10.73137	11.86503	12.64903	14.73180	13.58141	16.43186	17.96790	16.55317	18.15352	18.44935	18.13577	18.48945	1974
						49.20868	40.68824	26.65032	24.03721	22.52372	23.42993	20.74938	23.21763	24.24069	21.96918	23.28716	23.18423	22.46327	22.54083	1975
							32.21130	16.48928	16.49850	16.53690	18.75590	16.49963	19.83697	21.37878	19.22342	20.91632	21.01964	20.43079	20.66772	1976
								2.638858	9.356912	11.73651	15.61172	13.58886	17.89024	19.90493	17.69234	19.72216	19.95396	19.41282	19.75252	1977
									16.31695	16.58455	20.29143	16.50481	21.20283	23.05312	20.01632	22.04913	22.05007	21.23435	21.44338	1978
										16.65218	22.22428	16.50076	22.40346	24.40371	20.60968	22.86060	22.75994	21.77016	21.94734	1979
											28.06254	16.42512	24.38288	26.42078	21.41715	23.92699	23.63820	22.42550	22.55033	1980
												5.845229	22.58289	25.87822	19.81040	23.11605	22.93901	21.64072	21.87870	1981
													41.96735	37.27462	24.86353	27.85730	26.67573	24.49358	24.35286	1982
														32.73701	17.10062	23.47277	23.11746	21.26589	21.64471	1983
															3.306192	19.08602	20.06844	18.55848	19.53947	1984
																37.27620	29.44346	24.12472	23.98170	1985
																	22.05764	18.02929	19.84773	1986
																		14.13389	18.75037	1987
																			23.55381	1988

Ending Year

Total Outliers 24
Total Observations 210
89%: 1%-27%

Beginning Year

Active Investor

UNIVERSE - S&P500

EXHIBIT C

DIFF
ANNUAL
RETURNS

1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	YEAR
793557	0.477725	5.336781	5.314388	1.862286	2.283071	3.917285	4.864039	5.966912	6.864317	6.660073	6.367367	7.127124	8.327708	8.743619	8.296868	8.434234	8.384855	8.587416	8.702855	1969
	-0.98731	7.456187	6.745903	1.878453	2.386702	4.314965	5.369915	6.563434	7.511735	7.223504	6.855308	7.645872	8.921648	9.335368	8.811755	8.931977	8.851615	9.035889	9.141343	1970
		17.50924	11.31941	2.869791	3.186012	5.403432	6.494193	7.691806	8,628562	8.191599	7.701951	8.486131	9.818242	10.20628	9.575928	9.662394	9.533288	9.688723	9.766371	1971
			5.189871	-3.05199	-0.34421	2.890035	4.576855	6.281549	7.523978	7.166459	6.724461	7.682027	9.184287	9.648122	9.019000	9.144423	9.039747	9.235545	9.342544	1972
				-8.41077	-2.09387	2.270299	4.435221	6.448907	7.841463	7.402297	6.890257	7.920722	9.539718	10.01339	9.306320	9.423562	9.293752	9.484375	9.583763	1973
					3.723557	9.104465	10.29130	11.36525	12.16202	10.94788	9.896792	10.68843	12.28324	12.57600	11.53051	11.50146	11.20452	11.27279	11.26545	1974
						18.15967	15.49294	13.12592	15.22580	13.02165	11.37005	12.09815	13.82079	13.99573	12.64231	12.51382	12.09530	12.09907	12.03239	1975
							13.06284	13.80332	14.35673	11.94309	10.23268	11.25681	13.28430	13.54131	12.12132	12.03084	11.62487	11.66928	11.63075	1976
								14.13881	14.78528	11,58784	9.593322	10.92601	13.30341	13.59374	12.00775	11.97128	11.48952	11.54997	11.51860	1977
									15.45491	10.04743	7.693499	9.959779	13.06301	13.44236	11.61794	11.55614	11.10592	11.21586	11.21041	1978
										4.343375	3.373617	8.062741	12.41805	12.99832	10.93781	10.95032	10.51443	10.70874	10.75270	1979
											2.288964	9.872179	15.16121	15.24010	12.26519	12.08300	11.42173	11.51902	11.47881	1980
												15.57563	20.80147	19.17539	14.45857	13.86709	12.81262	12.70953	12.51923	1981
													27.20603	21.26522	13.94376	13.27005	12.08185	12.09675	11.96146	1982
														15.46596	8.053135	8.943503	8.565413	9.336085	9.636040	1983
															1.905598	5.903507	6.408639	7.923537	8.555187	1984
																10.94279	9.108983	10.23117	10.46317	1985
																	7.437238	9.888490	10.30016	1986
																		12.10639	11.66175	1987
																			11.15277	1988

Ending Year

Total Outliers 6
Total Observers 210

97%: exceeds S&P 500
by greater than 1.06%

Beginning
Year

```
        VALUE   YEARS        1        2        3        4        5        6        7        8        9       10       11       12       13       14       15       16       17       18       19       20
        OF      SP50  12.40084 2.027501 14.62040 26.33341 1.400594 17.27104 14.76132 -9.73040 25.77357 12.30881 1.062039 -11.5019 19.14846 31.54900 -29.7180 -17.3655 15.63326 10.78676 0.077762 -11.3614
YEARS   $1      FACTOR 1.124008 1.020275 1.146204 1.263334 1.014005 1.172710 1.147613 0.902695 1.257735 1.123088 1.010620 0.884980 1.191484 1.315490 0.702819 0.826344 1.156332 1.107867 1.000777 0.886385
   20 2.673984   1969 2.673984 2.376971 2.331696 2.034276 1.610244 1.568003 1.354130 1.179953 1.307144 1.039283 0.925380 0.915655 1.034662 0.868380 0.660119 0.939745 1.136626 0.952957 0.887757 0.886385
   19 3.016728   1970 3.016728 2.683901 2.630567 2.295024 1.816641 1.791546 1.527699 1.331197 1.474690 1.172496 1.043993 1.033021 1.167282 0.979687 0.744731 1.059635 1.282315 1.103750 1.000777
   18 3.013781   1971 3.013781 2.681280 2.627997 2.292783 1.814867 1.789799 1.526207 1.329896 1.473250 1.171351 1.042973 1.032013 1.166142 0.978730 0.744004 1.058600 1.281063 1.107867
   17 2.720344   1972 2.720344 2.420217 2.372122 2.069546 1.638162 1.615535 1.377607 1.200411 1.329807 1.057302 0.941424 0.931531 1.052600 0.883436 0.671564 0.955529 1.156332
   16 2.352562   1973 2.352562 2.093011 2.051418 1.789750 1.416687 1.397119 1.191359 1.038119 1.150021 0.914356 0.814146 0.805590 0.910292 0.763998 0.580770 0.826344
   15 2.846950   1974 2.846950 2.532854 2.482521 2.165863 1.714402 1.690722 1.441722 1.256278 1.391696 1.106509 0.985238 0.974884 1.101568 0.924551 0.702819
   14 4.050758   1975 4.050758 3.603850 3.532234 3.081680 2.439323,2.405630 2.051341 1.787485 1.980163 1.574387 1.401837 1.387106 1.567386 1.315490
   13 3.079277   1976 3.079277 2.739549 2.685109 2.342610 1.854307 1.828694 1.559374 1.358798 1.505266 1.196806 1.065639 1.054440 1.191484
   12 2.584403   1977 2.584403 2.299274 2.253582 1.966126 1.556300 1.534803 1.308766 1.140424 1.263353 1.004466 0.894329 0.884980
   11 2.920294   1978 2.920294 2.598107 2.546477 2.221661 1.758569 1.734279 1.478864 1.288643 1.427549 1.135015 1.010620
   10 2.889605   1979 2.889605 2.570604 2.519716 2.198314 1.740089 1.716054 1.463323 1.275101 1.412548 1.123088
    9 2.572910   1980 2.572910 2.289049 2.243561 1.957383 1.549379 1.527978 1.302[illegible]6 1.135352 1.257735
    8 2.045666   1981 2.045666 1.819976 1.783809 1.556275 1.231879 1.214864 1.035945 0.902695
    7 2.266177   1982 2.266177 2.016156 1.976091 1.724031 1.364667 1.345818 1.147613
    6 1.974687   1983 1.974687 1.756825 1.721914 1.502275 1.189135 1.172710
    5 1.683865   1984 1.683865 1.498090 1.468319 1.281028 1.014005
    4 1.660607   1985 1.660607 1.477397 1.448038 1.263334
    3 1.314464   1986 1.314464 1.169443 1.146204
    2 1.146797   1987 1.146797 1.020275
    1 1.124008   1988 1.124008
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Ending Year

Beginning
Year

EXHIBIT D

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                YEAR        1988     1987     1986     1985     1984     1983     1982     1981     1980     1979     1978     1977     1976     1975     1974     1973     1972     1971     1970     1969
        VALUE   YEARS          1        2        3        4        5        6        7        8        9       10       11       12       13       14       15       16       17       18       19       20
        OF      UNIVERSE 23.55361 14.13389 22.05764 37.27620 3.306192 32.73701 41.96735 5.845229 28.06254 16.65218 16.51695 2.636858 32.21130 49.70866 -25.9945 -25.7762 20.82305 28.29600 -0.88955 -9.5550[illegible]
YEARS   $1      FACTOR   1.235536 1.141338 1.220576 1.372762 1.033061 1.327370 1.419673 1.058452 1.280625 1.166521 1.165169 1.026366 1.322113 1.497086 0.740054 0.742237 1.208230 1.282960 0.991106 0.904[illegible]
   20 13.13839   1969 13.13839 10.63375 9.316914 7.833208 5.560474 5.382517 4.055024 2.856307 2.698569 2.107226 1.806419 1.550349 1.510516 1.142503 0.763151 1.031209 1.389376 1.149384 0.895274 0.904[illegible]
   19 14.52849   1970 14.52849 11.75885 10.30266 8.440835 6.148797 5.952012 4.484063 3.158517 2.984090 2.330162 1.997546 1.714362 1.670338 1.263385 0.843895 1.140315 1.536322 1.271567 0.991106
   18 14.65888   1971 14.65888 11.86439 10.39515 8.516594 6.203984 6.005433 4.524309 3.186866 3.010873 2.351096 2.015475 1.729770 1.685330 1.274724 0.851470 1.150550 1.550111 1.282960
   17 11.42583   1972 11.42583 9.247673 8.102477 6.638238 4.835680 4.680919 3.526461 2.483994 2.346817 1.832556 1.570957 1.348264 1.313626 0.993561 0.663676 0.896793 1.208230
   16 9.456665   1973 9.456665 7.653895 6.706067 5.494180 4.002281 3.874193 2.918698 2.055894 1.942358 1.516726 1.300212 1.115900 1.087231 0.822343 0.549295 0.742237
   15 12.74076   1974 12.74076 10.31192 9.034940 7.402191 5.392168 5.219617 3.932300 2.769862 2.616898 2.043453 1.751748 1.503428 1.464803 1.107926 0.740054
   14 17.21597   1975 17.21597 13.93401 12.20847 10.00222 7.286202 7.053016 5.313526 3.742780 3.536088 2.761219 2.367053 2.031509 1.979318 1.497086
   13 11.49965   1976 11.49965 9.307416 8.154822 6.681123 4.866920 4.711160 3.549244 2.500042 2.361979 1.844395 1.581106 1.356975 1.322113
   12 8.697932   1977 8.697932 7.039803 6.168022 5.053368 3.681168 3.563356 2.684523 1.890944 1.786518 1.395035 1.195893 1.026366
   11 8.474472   1978 8.474472 6.858943 6.009556 4.923541 3.586594 3.471810 2.615555 1.842363 1.740620 1.359195 1.165169
   10 7.273166   1979 7.273166 5.886648 5.157668 4.225600 3.078174 2.979660 2.244785 1.581198 1.493877 1.166521
    9 6.234916   1980 6.234916 5.046324 4.421407 3.622392 2.638762 2.554311 1.924340 1.355460 1.280625
    8 4.868649   1981 4.868649 3.940515 3.452537 2.828612 2.060526 1.994581 1.502656 1.058452
    7 4.599781   1982 4.599781 3.722903 3.261873 2.672404 1.946735 1.884432 1.419673
    6 3.240027   1983 3.240027 2.622365 2.297622 1.882407 1.371255 1.327370
    5 2.440937   1984 2.440937 1.975610 1.730958 1.418148 1.033061
    4 2.362818   1985 2.362818 1.912383 1.675561 1.372762
    3 1.721214   1986 1.721214 1.393091 1.220576
    2 1.410165   1987 1.410165 1.141338
    1 1.235536   1988 1.235536
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Ending Year

Beginning
Year

EXHIBIT E

EXHIBIT F

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            YEAR       1988     1987     1986     1985     1984     1983     1982     1981     1980     1979     1978     1977     1976     1975     1974     1973     1972     1971     1970     1969
   VALUE    YEARS         1        2        3        4        5        6        7        8        9       10       11       12       13       14       15       16       17       18       19       20
   OF       UNI-SP 11.15277 12.10639 7.437238 10.91279 1.965598 15.46596 27.20603 15.57563 2.788964 4.343375 15.45491 14.13891 13.06284 18.15967 3.723557 -8.41077 5.189821 17.50924 -0.98731 1.793352
72    1973      1974     1975     1976     1977     1978     1979     1980     1981     1982     1983     1984     1985     1986     1987     1988 0.037235 -0.08410 0.051898 0.175092 -0.00987 0.017933
20 10.45440     1969 10.45440 8.254785 6.965217 5.578931 3.950229 3.794514 2.700893 1.676333 1.391425 1.067944 0.881039 0.634693 0.475856 0.274123 0.103031 0.091964 0.252699 0.165926 0.009072 0.017933
19 11.51176     1970 11.51176 9.074754 7.672117 6.145910 4.532155 4.169463 2.956364 1.827320 1.509400 1.157685 0.953553 0.681361 0.503056 0.283678 0.099164 0.080680 0.254007 0.162596 -0.00987
18 11.64510     1971 11.64510 9.183115 7.767157 6.223811 4.389117 4.215634 2.998192 1.856969 1.537623 1.179745 0.972502 0.697757 0.519188 0.295994 0.107465 0.091950 0.269048 0.175092
17 8.705489     1972 8.705489 6.877455 5.730354 4.558591 3.197517 3.065384 2.149853 1.282583 1.017010 0.775253 0.629533 0.416733 0.261025 0.110144 -0.00788 -0.05873 0.051898
16 7.104102     1973 7.104102 5.560884 4.654648 3.704430 2.585593 2.477073 1.727339 1.017774 0.792337 0.602368 0.486066 0.310309 0.176939 0.058345 -0.03147 -0.09410
15 9.893811     1974 9.893811 7.779074 6.552118 5.236327 3.677785 3.528994 2.490577 1.513583 1.225201 0.936944 0.766510 0.528543 0.363214 0.183374 0.037235
14 13.16521     1975 13.16521 10.33016 8.676243 6.920542 4.846879 4.647386 3.262184 1.955295 1.555924 1.186832 0.965215 0.644403 0.411931 0.181596
13 8.420373     1976 8.420373 6.567867 5.469713 4.338513 3.012613 2.882465 1.989669 1.141244 0.856712 0.647588 0.515467 0.302534 0.130628
12 6.113528     1977 6.113528 4.740529 3.914439 3.087241 2.124868 2.028553 1.375757 0.750520 0.523164 0.390369 0.301514 0.141388
11 5.554178     1978 5.554178 4.260836 3.463081 2.701879 1.828024 1.737530 1.136691 0.553720 0.313070 0.224180 0.154549
10 4.383561     1979 4.383561 3.315843 2.637951 2.027286 1.338084 1.263606 0.781461 0.306096 0.091329 0.043433
 9 3.662005     1980 3.662005 2.757275 2.177846 1.665009 1.089383 1.026333 0.621394 0.220127 0.072889
 8 2.922930     1981 2.922930 2.120539 1.656728 1.272326 0.828646 0.779717 0.466710 0.155756
 7 2.333604     1982 2.333604 1.706746 1.295782 0.948373 0.532067 0.538614 0.272060
 6 1.265340     1983 1.265340 0.865540 0.575709 0.330132 0.162120 0.154559
 5 0.757071     1984 0.757071 0.477529 0.262632 0.137119 0.019055
 4 0.707210     1985 0.707210 0.431985 0.227572 0.109427
 3 0.406750     1986 0.406750 0.223548 0.074372
 2 0.253367     1987 0.253367 0.121063
 1 0.111527     1988 0.111527
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